

In This Issue—The A. E. A. Summer Meeting

MOTOR AGE

Vol. XLIV
Number 1

PUBLISHED WEEKLY AT THE MALLERS BUILDING
CHICAGO, JULY 5, 1923

Thirty-five Cents a Copy
Three Dollars a Year

8798



Hudson Prices

Speedster	.....\$1375
7-Pass. Phaeton	.....1425
Coach	.....1450
Sedan	.....1995

Essex Prices

Touring	.....\$1045
Cabriolet	.....1145
Coach	.....1145

All Prices, Freight and Tax Extra



Dealers Call Hudson-Essex Best Money Makers of All Cars

"If you can get the Hudson-Essex franchise, take it! It is the best franchise in the automobile industry today."

(Signed) Mark D. Moore
Moore Automotive Sales Co., Owatonna, Minn.

"Starting with \$80 and the Hudson franchise, we have built the biggest business in Western Kentucky."

(Signed) H. S. Melton
Choate-Melton-Hudson Co., Paducah, Ky.

"Built a million dollar business in two years with the Hudson-Essex franchise."

(Signed) Hamlin & Wichman
Hudson & Essex Motor Cars, Oakland, Calif.

"We built one of the largest automobile businesses in the state with the Hudson-Essex line—the best selling cars that are made."

(Signed) Wills Motor Car Co.
Lawrence, Mass.

Some Good Territories Are Open

Write Today

HUDSON MOTOR CAR COMPANY, DETROIT, MICH.

HUDSON - ESSEX

Tech.

\$1000 Cash Prizes for Repairmen 100 prizes in all

NO-LEAK-O

Piston Rings



Important: In buying piston rings insist on the genuine No-Leak-O with the original "oilSEALing" groove, packed in this standard package bearing the famous ring and seal, our registered trademark. Beware of imitations. Name stamped on every ring.

Get Your Hands on This Easy "Jack"

1st Prize.....	\$250 Cash	4th Prize.....	\$100 Cash
2nd Prize.....	200 Cash	5th-6th-7th-8th.....	50 Each
3rd Prize.....	150 Cash	9th-10th-11th-12th.....	25 Each

and 88 coupon books of 12 coupons each, each coupon good for one 50c No-Leak-O Piston Ring at your Jobbers—Worth \$6.00 to you.

We offer you an opportunity to win any one of the valuable prizes listed above. Here's how. We want to know what auto repair men throughout the country think of No-Leak-O Piston Rings as business builders. We will award the above prizes in the order named to the auto repair men writing us the best letters based on their own knowledge of No-Leak-O, and telling in their own way—1: How No-Leak-O Rings build business for repair men who use them. 2: Why No-Leak-O rings do what other rings cannot do, and 3: How No-Leak-O Piston Rings work.



Send the coupon below, and we will send you contest entry blank, and interesting printed matter telling all about No-Leak-O Piston Rings. You are not required to buy anything or assume any obligation of any sort to enter this contest. The prizes will go to the repair men displaying the greatest skill in expressing their honest opinion of No-Leak-O rings.

Send the coupon today, or write us. Contest closes October 1st, 1923.

NO-LEAK-O PISTON RING COMPANY Muskegon, Michigan

WON'T LEAK
because they're sealed with Oil

No-Leak-O Piston Ring Co. Dept. 174
Muskegon, Mich.

I am an auto repair man and want to compete for one of your prizes. Please send me contest entry blank, and printed matter telling all about No-Leak-O Piston Rings.

(Please Write Plainly)

Name.....

Address.....

City..... State.....

Have You Ever Used No-Leak-O Piston Rings?.....

MOON

in

Pittsburgh



The Reward of a "Go-Getter"

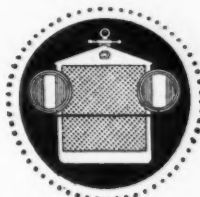
G. F. Reed made such an exceptional record as a Moon dealer in McKeesport, Pa., that when the opportunity came his work was rewarded by the Moon Motor Car Company and he was appointed distributor of the Moon in Pittsburgh. But read Mr. Reed's own words regarding sales:

"We sold 96 Moon cars during the five remaining months of 1922 after I became Pittsburgh distributor in August. During January, February and March, 1923, we sold 156, and now we are averaging better than 100 per month. We have set our quota for this year at 1,000 Moon cars, and we're going to reach it."

It's another case of "doubling sales"—with the Moon.

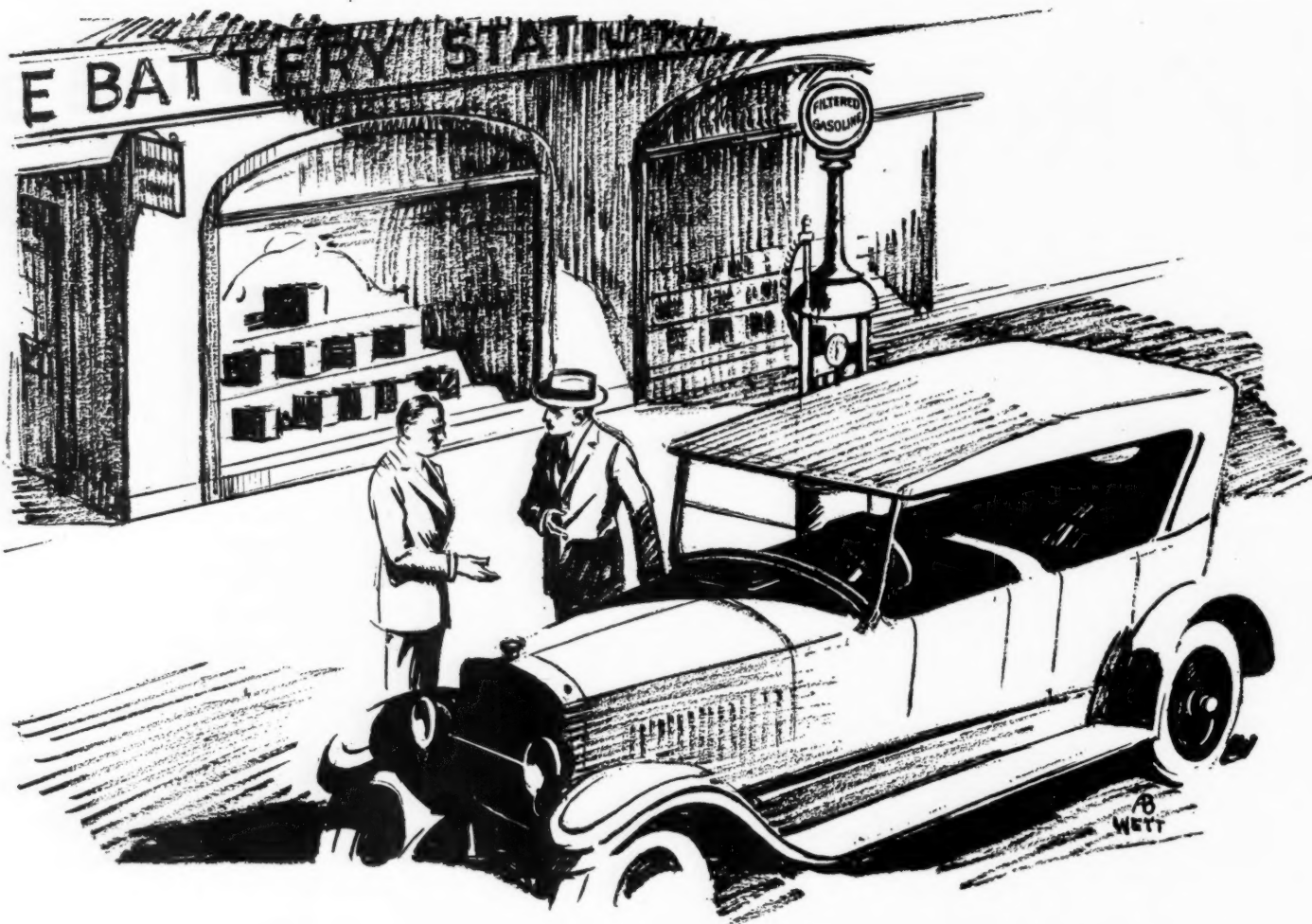
Will you double your sales in 1923?

The Moon Motor Car Company is building more cars than ever before in its history. In fact, more cars were built during the first five months of 1923 than during the entire year of 1922.



MOON MOTOR CAR COMPANY, ST. LOUIS, U. S. A.
Stewart McDonald, President

PUBLIC LIBRARY



New Customers and Greater Sales Come by Way of a Wayne Pump

Just as this battery man, after having profitably filled the gas tank, is telling of his battery service, so can YOU find, and cultivate, new customers through a Wayne curb pump.

The brilliant red Wayne pump—accurate, clean and convenient—will introduce you to more motorists than any other device you can install.

Car dealers, accessory and garage men, tire and battery

dealers, in every part of the country, depend on the Wayne curb pump method of increasing sales.

Not alone will you see a surprisingly active increase in the sales of your regular line, but also you will find the sale of gasoline is highly profitable in itself.

Let us send you complete information, telling the kind of equipment you should use and how we can aid you in securing a profit-paying installation.

Wayne Tank & Pump Company, 706 Canal Street, Fort Wayne, Indiana

Wayne Tank & Pump Co. of Canada, (Limited), Toronto, Ont., Canada

Division Offices in: Atlanta, Birmingham, Boston, Chicago, Cincinnati, Cleveland, Columbus, Dallas, Dayton, Des Moines, Detroit, Indianapolis, Jacksonville, Kansas City, Milwaukee, Minneapolis, New York, Omaha, Peoria, Philadelphia, Pittsburgh, San Francisco, St. Louis and South Bend

Warehouses in: Philadelphia and San Francisco

An International Organization with Sales and Service Offices Everywhere

REG. U.S. TRADE MARK
Wayne

HONEST MEASURE PUMPS

MOTOR AGE

Reg. U. S. Pat. Off.

Published Every Thursday by

THE CLASS JOURNAL COMPANY

MALLERS BUILDING
59 East Madison Street, CHICAGO

Vol. XLIV

Chicago, July 5, 1923

No. 1

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SUBSCRIPTION RATES

United States, Mexico and U. S. Possessions	\$ 3.00 per year
Canada	5.00 per year
All Other Countries in Postal Union	6.00 per year
Single Copies	35 cents

Subscriptions accepted only from the Automotive Trade

Entered as Second Class Matter Sept. 19, 1899, at the Post Office at Chicago, Ill., under Act of March 6, 1879.

A Business of Prospering the Dealer

A leading thought with Goodrich, as it has always been—prospering the dealer. And when a great organization like Goodrich bends its efforts in a certain direction results are positive.

Many letters like this speak for the dealer's appreciation of Goodrich aid. We quote in part:

"You outlined a sales plan, used successfully by a Goodrich dealer. I have put it into use in my own business and find that it is producing good results. The sales helps and suggestions which I get from both the Goodrich factory and the branch organization have enabled me to substantially increase my business."

Irvin C. Hawk,
Cape May Garage,
Greenwood, Delaware.

A constant stream of merchandising ideas, advertising helps and close sales co-operation comes to Goodrich dealers through field representatives and factory.

These bring business, but there is still a bigger factor that holds it—Goodrich Quality.

THE B. F. GOODRICH RUBBER CO.
Established 1870

Goodrich TIRES

"Best in the Long Run"



CHASE DREDNAUT Motor Topping

"DEFIES TIME AND THE ELEMENTS"

SELLECT a top material for more good reasons than its appearance. See what's behind it! Find out of what and how it's made. Learn how long and how well it has served top builders and car owners.

Be sure that its quality is uniform. Know that it is made *up* to a quality standard and not *down* to a price. Be satisfied that it is the kind of material which you can stand back of but don't need to because the material will make good instead of you having to do so.

Back of Chase Drednaut Motor Topping is a brilliant, unmarred 34-year record and reputation for quality. That's your protection.

L. C. CHASE & CO.

BOSTON

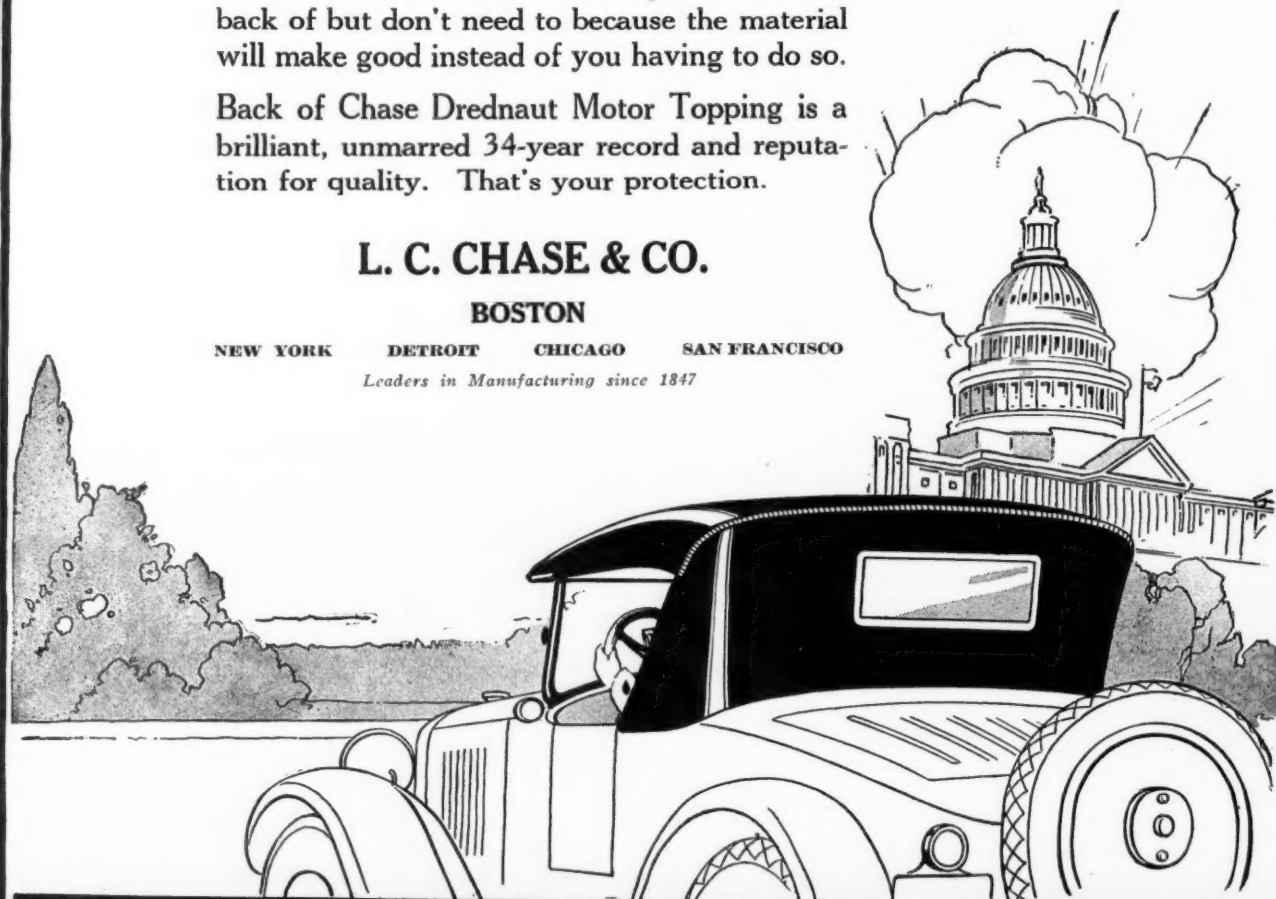
NEW YORK

DETROIT

CHICAGO

SAN FRANCISCO

Leaders in Manufacturing since 1847



STUDEBAKER



The Best Dealer's Contract Ever Offered

The Studebaker contract is the fairest, squarest dealer contract ever written.

That is why you will find so many capable business men in the big Studebaker family—why the contract is so favorably regarded by bankers. Why, in fact, so many former bank executives have gone into the automobile business—with Studebaker.

That is also one reason why fewer Studebaker dealers go out of business probably than those handling any other line of cars.

Because of its many exclusive features and others which Studebaker was first to adopt, the Studebaker contract offers a genuine opportunity to business men.

But back of the contract, and Studebaker's seventy-one year reputation for honest manufacture and integrity, is another powerful factor—a vital factor—which is offered by no other manufacturer—a *complete line of Sixes*, ranging in price from \$975 to \$2750, and in capacity from two to seven passengers.

No wonder the Studebaker contract is so highly regarded by business men, bankers and everyone interested in the industry.

THE STUDEBAKER CORPORATION OF AMERICA
South Bend, Indiana

MODELS AND PRICES—f. o. b. factories					
LIGHT-SIX		SPECIAL-SIX		BIG-SIX	
5-Pass., 112" W. B., 40 H. P.		5-Pass., 119" W. B., 50 H. P.		7-Pass., 126" W. B., 60 H. P.	
Touring	\$975	Touring	\$1275	Touring	\$1750
Roadster (3-Pass.) .	975	Roadster (2-Pass.)	1250	Speedster (5-Pass.)	1835
Coupe-Road.(2-Pass.)	1225	Coupe (5-Pass.)	1975	Coupe (5-Pass.)	2550
Sedan	1550	Sedan	2050	Sedan	2750

T H I S I S A S T U D E B A K E R Y E A R

Nash Leads the World in Motor Car Value

Nash Rises from 8th to 5th Place in New York

Little old New York, as the town on the banks of the Hudson is familiarly known, is rolling up a great vote for Nash.

1922 ended with Nash in 8th place in registration in the Metropolitan District for the year.

At the beginning of June, 1923, Nash had climbed to 5th place among all cars exclusive of Ford.

The old political axiom, "*as New York goes, so goes the country,*" seems almost equally applicable to motor cars.

All over the country the sale of Nash cars is rising higher and higher.

All over the country the Nash contract is taking on broader and more substantial value.

Wire us if you're awake to the profit-taking opportunities of a Nash dealer franchise.

NASH

THE NASH MOTORS COMPANY
KENOSHA, WISCONSIN

Nash Leads the World in Motor Car Value

(1746)

You can take a mechanic's word for it—He KNOWS



"TALK about gas economy in a big, powerful, eighty horse engine—this Cole's GOT it!

Here's the secret:

In the exhaust manifold of the Cole there is a butterfly valve that redirects all of the exhaust gases back over the intake header and heats it so that all of the new gas going in through the carburetor is vaporized down to the last drop.

And aside from economy, and smoother running, any mechanic will tell you that by vaporizing the gas thoroughly Cole saves burnt out bearings because if the gas is shot into the cylinders raw it runs down past the pistons and cuts the oil so that it is no good whatever as a lubricant.

In these Cole Master Models there isn't any way for raw gas to get into the cylinders."

COLE MOTOR CAR COMPANY
INDIANAPOLIS, INDIANA

COLE

There's a Touch of Tomorrow in All Cole Does Today



Install This Switch While They Stop for Gas

This new switch by the engineers of Cutler-Hammer is so easy to install that you can mount one for a driver while his car is standing at your gas pump. There are no screws to align—*not a measurement is required*. Just drill one single 7-16" hole where the new switch is desired, insert the stem, turn on the nicked collar, and the car is ready to go. It is furnished in two sizes, fully adjustable, to fit metal or wood dash boards of any thickness. And enclosed in the dustproof body is a *real* switch mechanism—the famous C-H knife-blade contact type that is not affected by vibration—to keep lights flickerless on the roughest roads.

Open new avenues of profit for yourself by suggesting this easily installed switch for the convenient control of spotlights, parking lights, windshield wipers, cowl lamps, etc. The switch produces a good profit and its fast installation makes your time worth dollars. Packed in handy cartons of twenty and neat unit boxes for direct sale across your counter. If your jobber has not yet been stocked, write direct and we will see that you are supplied.

THE CUTLER-HAMMER MFG. CO.

Switch and Specialty Department
MILWAUKEE · WISCONSIN

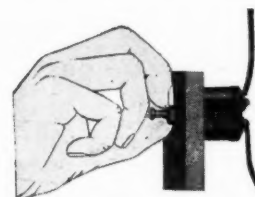
Easiest to Install



Drill or punch one 7-16 inch hole in the dash at point where the switch is desired.



Adjust set-rings to thickness of dash and insert switch stem.



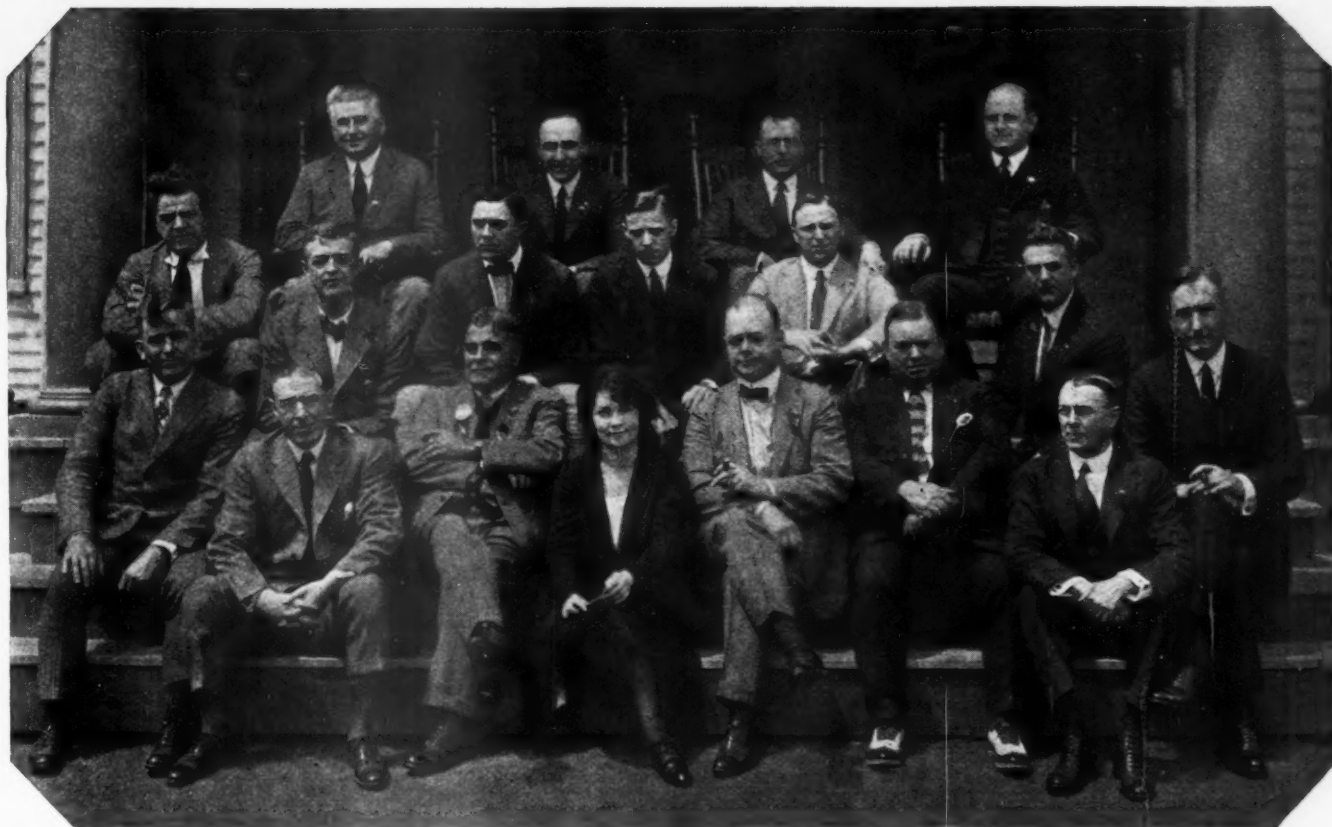
Turn home the knurled locking collar and the switch is installed. Note mechanism is completely enclosed. Full sized binding screws with cupped washers make wiring easy.



One Hole

AUTOMOBILE SWITCH

MOTOR AGE



A. E. A. Board of Directors at the Dixville Notch Convention. Lower row, left to right—G. Norman Baughman, G. Norman Baughman Co., Tampa, Fla.; W. L. Moneur, Cutten & Foster, Ltd., Toronto; William M. Webster, Commissioner of Association; Miss Kathryn Marron, secretary; N. H. Oliver, Metal Specialties Mfg. Co., Chicago, president of the A. E. A.; F. B. Caswell, Champion Spark Plug Co., Toledo; G. H. Southard, Berkshire Products Corp., Pittsfield, Pa.; N. F. Ozburn, Ozburn-Abston & Co., Memphis, Tenn. Second row—W. T. Morris, American Chain Co., Bridgeport, Conn.; Wallace G. Page, American Motor Equipment Co., Boston; W. E. Wissler, Herring Motor Co., Des Moines; W. C. Hecker, Curtis Pneumatic Machinery Co., St. Louis; S. D. Black, Black & Decker Mfg. Co., Baltimore; Percival Stern, Interstate Electric Co., New Orleans. Third row—C. C. Hillis, Electric Appliance Co., San Francisco; W. H. Parken, National Standard Co., Niles, Mich.; C. L. Hodgson, Weaver Mfg. Co., Springfield, Ill.; E. V. Hennecke, Moto-Meter Co., Long Island City, N. Y., chairman of the board.

A. E. A. Continues Merchandising with Christmas Film

Largest Spring Meeting Adopts Dealer Aid Program for the Next Six Months of Promotion Work

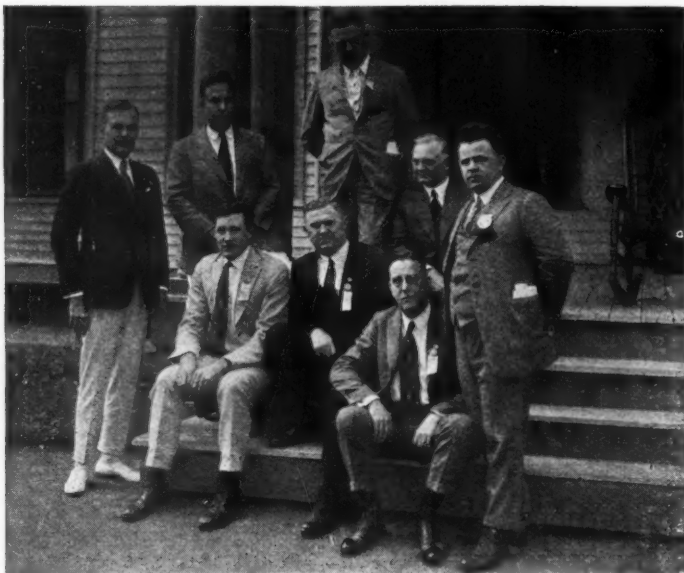
By CLYDE JENNINGS

THE merchandising work of the Automotive Equipment Association will be continued. A new merchandising film was shown at the Spring Meeting of the Association at Dixville Notch, N. H., last week and will be sent on the road for the summer and fall campaign of the Merchandising Department.

This film features Christmas merchandising and will boost the idea that was promoted last fall through stickers and similar publicity to make automotive wares popular as Christmas gifts. The film is based on the visit of a job-

ber's salesman to a small salesroom of a maintenance shop and the difference that was made in the place with some holly paper, Christmas signs and trimmings and a show window display.

This salesroom, like so many that are seen throughout the country, was clean enough, but there was nothing attractive about the showcases and the window display was entirely neglected. Under the leadership of the jobber salesman and with the use of about \$1 worth of holly paper, cards, pictures and wreaths, the place was trans-



The A. E. A. Membership Committee. Sitting, left to right—H. C. Farran, Farran-Kinney Co., Chicago; Arthur C. Storz, Storz-Western Automobile Supply Co., Omaha; T. H. Van Horn, Harvey Spring & Forging Co., Racine, Wis. Standing—Jesse F. Brown, S. & M. Lamp Co., Los Angeles; George H. Niekamp, Beck & Corbitt Iron Co., St. Louis; W. A. White, Orr Iron Co., Evansville, Ind.; W. G. Pancoast, Biflex Products Co., Waukegan, Ill.; B. W. Ruark, field secretary, A. E. A.

formed into an automotive Christmas gift shop. There was enough stock on hand to trim both the show case and the show window when a real effort was made to display it.

This picture was recently made in the mountains of California where snow lies on the ground late and by this means it brings into the picture late merchandise and cars.

The picture was shown at the spring meeting during a session that was devoted to the Merchandising Committee. L. A. Safford of The McQuay Norris Manufacturing Co., presided and introduced Arthur T. Mogge who had succeeded Ray W. Sherman in charge of Merchandising work under direction of the committee. Mogge told of the extent of the work of conducting merchandising meetings, and statistics of the showing of the "Ask 'em to Buy" and "Shop Profits" films. He also outlined how big this dealer industry is and how much opportunity there remains for the promotion of this idea.

Robert W. Stranahan of the Champion Spark Plug Co., originator of the Merchandising Department, spoke in behalf of the movement and outlined the possibilities as he saw it. He announced that the assessments levied last year had proven sufficient for the work of the year and there was a balance to carry this work on until the November meeting of the Association in Chicago.

Before the adjournment of the convention it was announced that changes had been made in the merchandising committee. The new members added are:

N. F. Ozburn, Ozburn-Abston & Co., Memphis;
R. W. Procter, Black & Decker Mfg. Co., Baltimore;

Arthur C. Storz, Storz-Western Automobile Supply Co., Omaha, Neb.

The members remaining on the committee are R. W. Stranahan, chairman, L. A. Safford, N. H. Oliver and W. E. Wissler.

Price Cutting Practice Reported

A resolution suggested by the Vigilance Committee had a very direct bearing on merchandising. It is the duty of this committee to hear all complaints of members against other members that suggest unethical practices. One of the complaints that came up this year refers to the practice of some jobbers in western cities of taking from the dealer any slow sale merchandise and allowing him a small percentage of credit or the wholesale value on these goods. For instance, a dealer has \$250 worth of slow sale goods. The jobber takes up these goods but instead of arranging an immediate trade, the dealer will be allowed a 5 or 10 per cent credit on all goods purchased until the entire line of credit is consumed. If the

dealer is allowed only 5 per cent credit, he must buy \$5,000 of goods from that jobber to get all of his allowed credit. In many cases this is viewed as merely a price cutting plan by the jobber. Where the plan was not used as a price cutting scheme, it was regarded as tying up the customer by unfair means.

The strange part of it appeared to be that some one has written this plan and has then copyrighted the writing. Jobbers and manufacturers have been paying the persons holding the copyright for the privilege of using the old plan. It is said to have spread rather rapidly. A very frequent use of the plan was to take up from dealers considerable quantities of merchandise that they had overbought because of offers of special discounts on large lots purchased direct from manufacturers.

The occasion of a report of the complaints of some jobbers that manufacturers packed their goods in flimsy cartons served to partially define the duties of the Merchandising Department. The complaint was that many cartons became broken and the contents were left not in condition for sale. A motion was made that this complaint be referred to the Merchandising Department, but it got no support and later the complaint was referred to the Standardization Committee; which appeared to define the Merchandising Department as for the aid of retail merchants and not manufacturers.

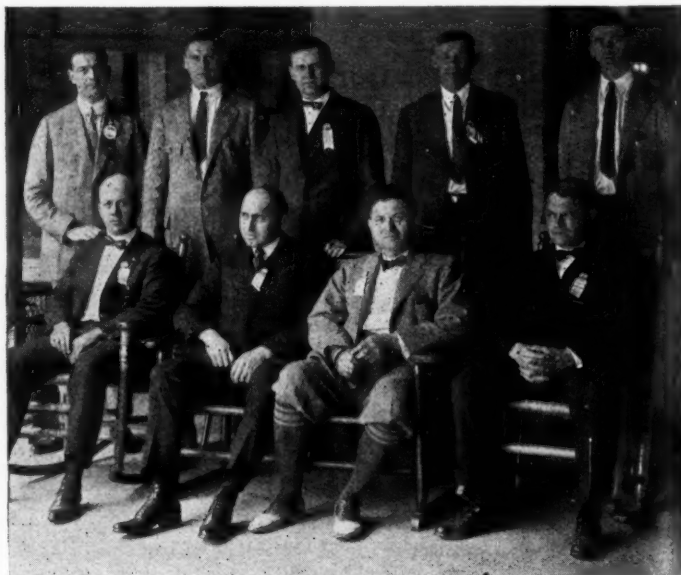
Aside from these features of the Association activities, the informal talk between manufacturers and jobbers in the hotel corridors and on the golf links will have more bearing on the affairs of dealers than any business transacted by the Association.

Jobbers Quit Selling All Lines

There is no doubt that the great majority of jobbers have quit cold on the idea that they should sell all of the merchandise in the automotive line. For the most part, the jobbers are contenting themselves with two or three lines of spark plugs, one line of gaskets, three lines (low, medium and high priced) timers and so on through the lines.

It is their idea that to attempt to sell all kinds of spark plugs, gaskets or timers requires too much money to stock them, too much space to store them and too great a tax on the salesman to keep track of the duplicate lines.

The jobbers also reported that there was a greatly improved sentiment on the part of the dealers toward cutting out purchases of large quantities of goods direct from manufacturers or job lot brokers because they could get an added per cent



A. E. A. Standardization Committee. Sitting, left to right—R. W. Proctor, Black & Decker Mfg. Co., Baltimore; Theodore Bass, National E. & A. Supply Co., Peoria, Ill.; F. C. Linscott, Linscott Supply Co., Boston; E. D. Waite, Waite Auto Supply Co., Providence. Standing—J. Ross Jennings, A. E. A. Secretary of Committees; C. R. Swishelm, Crescent Tool Co., Jamestown, N. Y.; M. McCormick, McCord Mfg. Co., Detroit; C. F. York, York Supply Co., Greenville, O.; H. J. Hagen, Splittorf Electrical Co., Newark, N. J.

discount. It is the verdict of the jobbers that dealers are realizing more than ever before the meaning of small investment and turnover.

As to the regular transactions of the Association, there is not much to say except that the tendency is to better merchandising conditions and a greater stability of the system now in operation. The fact that the Association had endeavored recently to gather from jobber members some overhead costs of operation and that the replies were hardly comparable is evidence that the dealers are not the only factors that do not entirely understand the factors of merchandising.

The feeling of the leaders in the Association work is that the automotive field offers a splendid opportunity for those manufacturers and jobbers who grasp the economic ideas of distribution and that there will be a survival of the fittest. The Association offers the means of education but the member must avail himself of the opportunity or the Association means little to him.

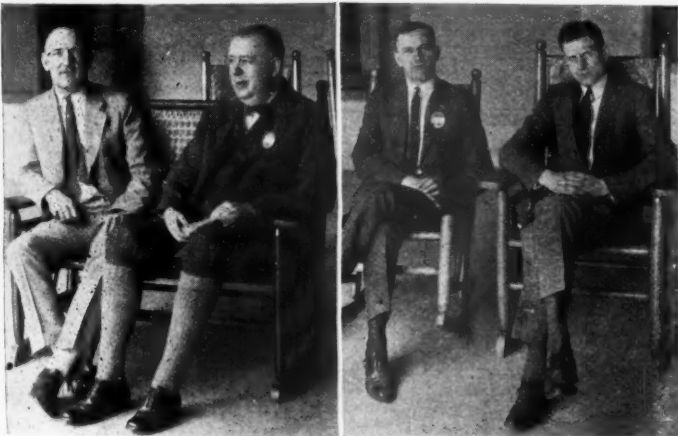
Less Work for Vigilance Committee

The fact that the Vigilance Committee had less work to do than for several years was regarded as an indication that fair trade practices and educational work are having a definite effect, all of which will work to the benefit of the dealer who cares to ally himself with the jobber who is pledged to these practices and lives up to them.

The convention was a remarkable gathering. It was held in The Balsams Hotel at Dixville Notch, N. H. The hotel is all of the community. A beautiful spot has been cleared sufficiently for the buildings in a picturesque section of the White Mountains. When the hotel closes, the town is closed, postoffice and all.

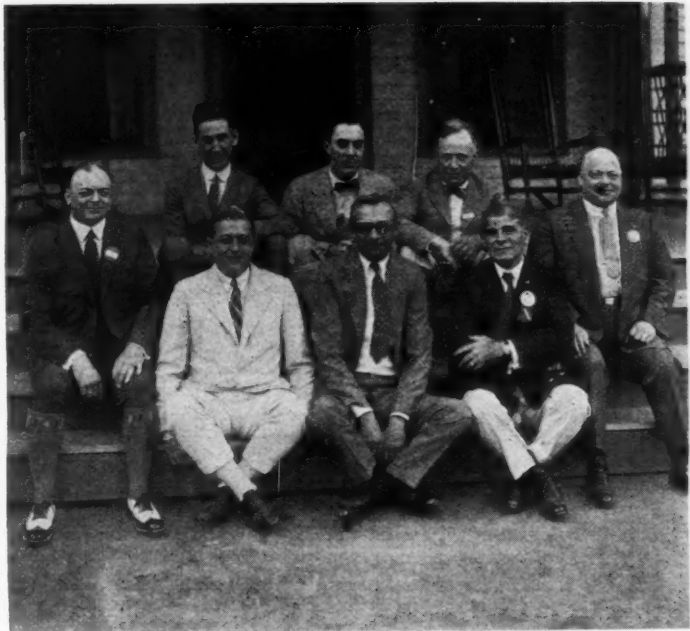
The attendance at the convention was larger than at any previous convention and larger than was anticipated when this hotel was selected. At the peak, the attendance was almost 800 and the guests overflowed the guest rooms into the dormitories where the hotel help is usually quartered. There was much complaint on the assignment of rooms, but when it was understood that the trouble was caused by the great interest in the meeting, the situation cooled down and the gathering became a pleasant one. Amusement was supplied by a golf course on top of a mountain, tennis courts in a valley, base ball on a level space where the mountain has been hauled away and trout fishing in natural and artificial lakes and mountain streams.

The convention decided, however, that variety was desirable and next year the meeting will be held in New Orleans, instead of an isolated resort. The date will be the first week in April.



A. E. A. Sergeant-at-Arms Gordon Ames, Timing Gear Corp., Chicago; Lee Freudenthal, Champion Spark Co., Toledo; Albert Swanson, Auditor A. E. A., and Edward C. O'Donnell, A. E. A. Merchandising Department

The meetings were presided over by President N. H. Oliver of the Metal Specialties Mfg. Co., and Commissioner William H. Webster. Business was conducted with a dispatch that amazed the newer members who were not familiar with the routine and the committee work. A feature of the meeting was the presence of Gov. Brown of New Hampshire on the opening day. His talk on "Loyalty," both in business and governmental affairs, found a hearty support among those present.



A. E. A. Merchandising Committee. Left to right, first row—R. A. Stranahan, Champion Spark Plug Co., Toledo; L. A. L. Safford, McQuay-Norris Mfg. Co., St. Louis; Commissioner William M. Webster. Second row—N. H. Oliver, Metal Specialties Mfg. Co., Chicago; Arthur R. Mogge, in charge A. E. A. Merchandising Dept.; W. E. Wissler, Herring Motor Co., Des Moines, Iowa; W. T. Walker, Walker Mfg. Co., Racine, Wis.; Howard M. Dine, Dine-DeWees Co., Canton, Ohio

As there were more wives and daughters present than ever before, there were naturally more social features and more gaiety in the evenings and afternoons.

The local arrangements were in charge of The New Englanders, a large committee composed of manufacturers and jobbers in the New England states. This committee, headed by Frank T. Chase of the Frank Mossberg Co., was always on the job and did everything for the guests, even to shopping in the neighboring towns. This committee and Commissioner Webster and the Board of Directors were extended standing vote of thanks at the close of the business session.

Quite a class of new members was received. They were;

Jobbers

Bushwick Auto Supply Co., Brooklyn;
H. A. McRae Co., Troy, N. Y.;
R. W. Norris & Sons, Baltimore;
Baltimore Hub, Wheel & Mfg. Co., Baltimore;
Interstate Motor Equipment Co., Raleigh, N. C.;
Cummins & Emerson Co., Peoria, Ill.;
Clark-Smith Hardware Co., Peoria, Ill.;
The Banta Co., Los Angeles;
Norfolk Motor Equipment Co., Norfolk, Va.;
Casamare Supply Co., Philadelphia;
Toronto Accessories Co., Toronto;

Manufacturers

McKinnon Dash Co., Buffalo;
Jewel Belting Co., Hartford, Conn.;
Bell Mfg. Co., Division of Northern Industrial Chemical Co., Boston;
E. M. Smith Co., Los Angeles;
Lincoln Products Co., Chicago;
Forest Electric Co., Newark, N. J.;
North Bros. Mfg. Co., Philadelphia;
Whittaker Battery & Supply Co., Kansas City;
Van Norman Machine Tool Co., Springfield, Mass.;
J. H. Williams Co., Brooklyn;
Perfection Spring Co., Division Eaton Axle & Spring Co., Cleveland.

The western delegation went by special train from Chicago and the ten carloads of people stopped in Toronto and Montreal. In both cities the local members of the association had made provision for their entertainment and arranged sight seeing trips. In Montreal the Americans had the novelty of the contemplation of a wine list for a Sunday evening dinner.

Factory Co-Operation Exemplified in Service Manual

Engineers of Stephens Motor Car Co., Prepare Book Which Sets Forth Detailed Information of Interest and Help to Dealer and His Maintenance Department

OF late quite a bit has been said about the distinct service a factory can offer its distributors and dealers in the way of printed matter that will materially assist dealer establishments in knowing much better the product they are selling and maintaining. The more the dealer, his salesman, his mechanics and others connected with the business know about a car, the better the chances for intelligently selling and servicing that car.

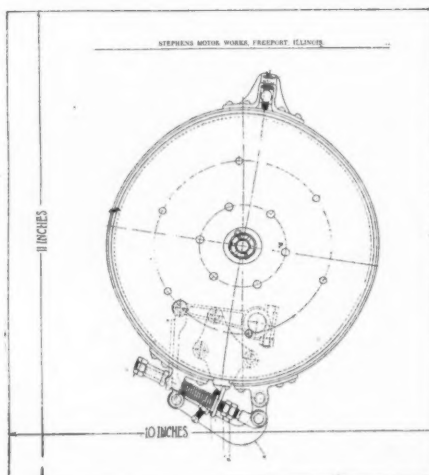
Very often the factory possesses information which would be of vast assistance to the dealer and his service department were such information given out in a tangible form whereby it could be quickly applied to any particular problem which might come up.

Along this line mention is here made of the service manual which has been compiled by the Stephens Motor Car Co., Freeport, Ill. This book, aside from being a handsome article in itself, goes into minute detail regarding every phase of work connected with the design, construction, selling and maintenance of Stephens cars. The text matter is well presented and a copious use is made of diagrams, cross sectional views of the various units, etc. The book was prepared by E. G. McDonald, chief engineer, and R. W. Lytle, assistant chief engineer of the company.

Essentially the book, which roughly speaking, contains 200 pages with a page size of 10 by 11 in., is divided into four major parts.

Drawings Quite Large

Part 1 takes up the mechanical features of the car in a descriptive way and is illustrated with many cross sectional views of such units as the engine, clutch, axles, steering gear, etc. These illustrations, by the way, are quite large so that



The drawings in the book are very large, as shown by this brake layout as compared to the size of the page

it is easy for the maintenance man to trace any detail he may be referring to. The illustrations are accurately made, having been taken from the original blueprints. Part 1 also contains an elaborate presentation of the manner in which Stephens bodies are built and finished.

There also is in Part 1 a chapter devoted to the reasons behind the various constructions used in the car. The company sets forth what it believes to be the advantages accruing from such a design and construction.

The final chapter of part 1 is devoted to the set up and adjustments of the car. The work is logically divided and, beginning with the adjustments necessary on the engine, it follows on to the carburetor, electrical units, clutch, rear axles, brakes, front axle, steering gear, springs and wheels.

Part 2 is devoted to the symptoms, causes and preventions of trouble. It also gives the emergency operations to be used to avoid aggravations. Instructions for making practically every repair which is likely to be encountered in service are clearly presented and here again, many illustrations are used to supplement the text. Part 2 takes up the various units in exactly the same order as in part 1, but in addition dwells upon the tire pump, speedometer, hood, running boards and fenders, body and doors and electrical units.

Part 3 takes up the operations of the car, including starting and stopping, use of brakes, explanation of engine, operating cycles, function of the cooling system, where and when to oil the car, where to make the adjustments necessary from time to time, body care, how to wash the car, how to preserve the top, etc.

Parts List Very Complete

Part 4 is called the Master Parts List and the first part of the chapter is devoted to the characteristics of the various models which the company has built. The various changes made in the different series are stated as well the characteristics of the model D engine which the company now is using. Then follows the parts list, this being made up in groups, such as the clutch group, internal brake group, water pump group, etc. The last pages of the book are devoted to illustrations of the parts for better identification by those who may not be familiar with the name of a certain part in question.

Altogether the book is admirably gotten up and should save many an unnecessary letter from dealer to factory or vice versa on matters which come up from day to day in the selling and maintaining of motor cars.

CHARACTERISTICS OF MODELS	
MODEL 60 SERIES 60-Standard 60-Testing	Covers Models 60-65 and comprises cars numbered between 101 and 1100. Used Continental T-36 Motor, Zenith Carburetor on first 450 cars and Stromberg on remainder; Auto-Lite System used on first 600 cars and Delco System after 600; Hex Axles (1/2 floating on rear) and had a wheel base of 115 inches.
MODEL 70 SERIES 70-Standard 70-Sport 70-Testing 70-10 Passenger 70-10 Sedan	Covers Models 70-74-75-76-78 and comprises cars numbered between 10001 and 10000. Used Stephens Salient Six motor, Delco System, Stromberg Carburetor, Hex Axles (different type from Model 60-65, but 1/2 floating) and had a wheel base of 118 inches.
MODEL 80 SERIES 1 80-Standard 80-Sport 80-10 Passenger 80-10 Sedan	Covers Models 80-84-84B-86 and comprises cars numbered between 15001 and 15400. Used Stephens Salient Six motor of the improved type, Tilton Carburetor, Auto-Lite System, Hex Axles (Same as Model 70) and had a wheel base of 122 inches.
MODEL 80 SERIES 2 80-Standard 80-Sport 80-10 Passenger 80-10 Sedan	Covers Models 82-83-84-84B-85-86 and comprises cars numbered between 15200 and 15400 and under 20000. Same as Model 80 Series 1, except that Stan Par axles are used of the semi-floating type, and a change in the length of the propeller shaft.

TIRE PUMP	
AIR PRESSURE LOW: NO AIR PRESSURE INDICATED BY GAUGE:	Replace the felt washer in the wheel bearing adjusting nut. Hose leaking. Hose connection not tight. Air tube split. Air tube not tight on pump. Outlet valve spring wax. Valves not seating. Piston ring worn. Piston cracked. Hose leaking. Air tube split. Air gauge out of order. Inner tube leaking. Valve stuck. Piston ring and cylinder scored. Cylinder cracked.

At the left is shown a specimen page which tells of the characteristics of the various models the company has built. This information naturally is of vast help to the service man. At the right is a section of a page taken from the trouble shooting section of the book. This section, it is stated takes up all of the possible sources of trouble which may arise in service

Long Dating on Tire Sales Is Destructive To Tire Merchandising Success

At Recent Mid-West Rubber Association Meeting Not a Single Manufacturer Defended Practice That Violates All Rules of Successful Merchandising

By CLYDE JENNINGS

Seventh Article

WE had thought that we had a big job cut out for us in writing the indictment of the spring dating plan of selling tires. It had seemed, according to investigations, that this idea was strongly entrenched with some manufacturers and the dealers would have to fight with all of their might and main to dislodge the manufacturers from this position.

At the June meeting of the Mid-West Rubber Association, Harvey Firestone denounced the advance dating sales and every manufacturer at this meeting apparently agreed with him. There was absolutely no sentiment in this meeting for the continuation of the sale of tires on several months' time. One manufacturer said that as an evil it ranked second to the definite mileage guarantee which has happily been done away with.

The members of the Mid-West Rubber Association made the case against the long time sale method, also they reported that some companies are not selling tires on next September and October dating.

One of the manufacturers said that in selling tires on these long datings, the manufacturers were simply financing dealers; that they were putting men into business who did not have the capital to go into business and who, more than likely, are merely looking to skim some profit from the season's business.

One manufacturer made the statement, and none disputed him, that during the month of May just closed, more tires were returned to wholesale depots than were sold. These returned tires, he said, were tires that were sold to dealers last October and November on bills dated in May. Owing to the dull spring, mail order competition and some other trade deterrents, the dealers were unable to sell them and so returned them.

The manufacturer cannot refuse to take them back, because

The first six articles of this series were published as follows:

May 24—Now Is the Time to Add Tires to Your Transportation Store.

May 31—Tire Sales Not "Small Change," Totals Run Large.

June 7—What Tire Makers Are Doing to Make Tire Selling a Better Business.

June 14—Some Things the Tire Manufacturer Can Do to Improve Tire Merchandising.

June 21—Competition You Must Expect in Tires, and Some Suggestions.

June 28—What the Dealer Can Do to Promote Tire Trade.

if he does not take the tires the dealer will go into bankruptcy and the manufacturer merely gets what is left after the receiver and others take their pickings out of the dealers' business.

Some dealers, of course, are "sitting pretty," as one of them expressed it, on last fall's datings. This man bought some \$5000 worth of tires last October and was to pay for them in March and April. He did not have much sale during the winter but he congratulated himself on the two raises in prices. When the bills came due, he had the money to pay promptly and so he is in the retail market with some very cheap tires.

This man happens to be a good merchant. He always prices his merchandise on a basis of what it will cost to replace it. When prices are cut on his stock, he takes his loss. This spring he is taking a double profit on his sales. He is not disturbing his local market and is even declining to meet some competition that he could well meet.

But not all merchants are so fortunate as this man. Some cannot see that the replacement basis is the proper method of meeting competition. They think that the original cost of the goods is a basis on which to sell and that when they buy new stock is the proper time to consider new prices.

These men fall into the fatal trap that has brought about so many merchant failures. In times of advancing prices they do not build up a reserve to help them over the period of falling prices. So when heavy losses come on a falling market the loss is theirs with no reserve to meet it. So they go broke.

This merchant, despite the fact that he has things so nicely in his favor this spring, is not an enthusiast for long datings. He remembers when the prices were cut on his paid for stock; that the adjustments were not satisfactory and that he had a

How Some Manufacturers Avoid the Long Dating Evil

THIS Spring, when the long dating tire factories went out in May to stock up those tire dealers who had escaped the Spring dating overload, the Racine Horseshoe Tire Co. decided to make an aggressive effort to meet this long dating competition and also to bring to the dealer's mind some of the problems involved. By request, the Horseshoe factory supplied to us the following information:

Primarily, we wanted to bring home to our dealers some fundamental thoughts on the tire merchandising and long dating practice. So we sent them an advance circular under the title, "We have a check for you." Our salesmen made this proposal:

"When you get a long dating, you pay for it in some way. We do not want to do a long dating business as we want you to order a 30 days' stock, let you pay for that stock, then sell you more as you need the stock. So we propose to sell you your May stock of tires on the regular list and rebate you 3 per cent on those you have sold and paid for when you pay for this

bill." This we did. We suggested to the dealer that as this check would not be a very large one, he might turn it over to the floor man who sold the most tires during May.

This method kept our dealers off of the long dating propositions and they are today doing a nice business under the law of supply and demand for their communities and knowing of their profits at the end of the month.

Dealers might tell other factories about this plan which makes for good merchandising.

Now just a word about branches. Some of the larger factories insist that expensive offices and so forth are needed. An eastern tire company en-

tered the Chicago market the other day. Instead of leasing offices for five years, this company rented desk room and telephone in a warehouse at a nominal rental by the month. The tires will be handled in this warehouse. The charge for receiving and delivering 32x4½ tires is 4 cents a tire. Storage is 4 cents a month, so to ship tires to Chicago, store them one month and have them delivered to a customer costs 8 cents per tire, each additional month is 4 cents per average tire.

If a tire company is seeking economical distribution, this scheme should appeal. Most branches are a very expensive form of vanity. The tire consumer and tire dealer pay for it.

Why Long Dating on Tires and Not Other Products?

It so happens that several of the manufacturers of tires also manufacture rubber footwear. This is a heavy production item with them and is even more seasonable than automobile tires.

And yet, rubber footwear is not sold on the long datings as tires are sold. Advance orders are taken to indicate the production needs. These orders may be taken several weeks in advance of the rubber footwear selling season, but the goods are not shipped at that time. They are warehoused and shipped on the date indicated by the merchant, and are billed on regular mercantile credit terms.

Perhaps shoe dealers are not easy enough to carry the warehousing problems of factories in their list of troubles.

lot of trouble. He buys on long datings for protection as much as anything else. He is afraid that if he does not buy on long datings and some one else in his market does and prices are advanced, that he will be paying high prices for tires while his rival will have them at a much lower cost and cut the sales from under him.

All that this merchant really wants is an even chance with his competitors.

Firestone said at the Mid-West meeting that the proposed new Rubber Manufacturers' Association probably could remedy the long dating sales evil. It seems to be the popular idea with the manufacturers that this long dating should be eliminated, but some of them are right now trying to sell tires on these long datings.

The dealer becomes a factor in this when he takes the stand that he will not buy on the long dating, because he is likely to destroy himself. Every dealer knows that it is a practice of some companies to sell one merchant on a long dating and then because he does not send an order at frequent intervals, use that as an excuse to establish another dealer in that city.

There are so many manufacturers who do not sell on long datings that it would appear to be quite foolish for a dealer to buy that way. We have always believed that a good tire, properly backed by a dealer, can compete with any other tire in the market. The tourist trade, likely, will demand well known brands but the home market is the bulk of the sales after all and any dealer who is putting his force behind a good tire, can always keep a few widely advertised brands in stock. This course is suggested only because it appears from reports that the bigger tire manufacturers are the stalwarts of the long dating practice.

Over stocking, which leads to price cutting and then to general demoralization of the trade sum up the arguments against long dating.

Many other things have developed in the Mid-West Rubber Association meetings that point to basic faults with the tire industry. This Mid-West is quite a virile association. At these meetings, manufacturers talk to each other in plain language.

One of them said in a recent meeting:

"Very few tire manufacturers actually know what it costs them to make tires."

Those of us who have looked on from the outside can easily believe that.

A big jobber of private branded tires recently said that he was not in the market for a factory because he could buy tires cheaper than he could make them.

This man sells more tires than some factories. He buys from the factories in dull seasons. He buys tires at less than he could produce them for. The manufacturer loses money on these tires. The manufacturer then tries to recoup this loss through high prices to his dealers.

The result is that the manufacturers' dealers are competing with tires made in the same factory and sold at a lower price than the manufacturer made them for himself. Also it seems to be a fact that these jobbers are able to sell tires to dealers more economically than the manufacturer. Usually, the jobber

selects a certain territory and works that territory hard. This is often a different policy than that of the manufacturers.

We know of some rather small manufacturers who tackle the tire market as though they expected to sell 60 per cent of the tires used. They advertise for dealers anywhere and everywhere and also they advertise their tires in national mediums, when probably they have dealers in only 10 per cent of the counties in the United States. Just why should a tire manufacturer who makes less than one per cent of the tires produced act like a national factory? The waste in such advertising and distribution is almost a crime.

And speaking about making tires for quantity buyers cheaper than the manufacturer can make them for himself, what about the mail order competition. Where and when do the mail order houses get their tires. Have you asked your factory if they were making them? There are a lot of dealers who are trying to sell \$12 to \$15 Ford size cords in opposition to \$9.90 cords made by the same factory.

Some tire manufacturers raise the point as to how they would handle the surplus winter production if they did not ship these tires out to dealers and let the dealers carry the warehouse expense. Perhaps they have made the dealer believe that this is the only way they can handle the surplus production.

The answer is readily found in the great warehouse industry that has been built up in this country. These warehouses handle surplus products of other kinds of merchandise quite efficiently. They serve the manufacturer as distributor and shipper, so that a dealer can order his supplies from this warehouse station. The manufacturer can borrow money on this warehoused stock, just as easily as he can on his bills to a dealer. Such a plan would be much more equitable to all dealers and would keep the merchandise in possession of the manufacturer at all times, instead of having him ship it out in winter, having it carried in the dealer's place of business for two or three months and then shipped back to the manufacturer because the dealer cannot pay for it.

If any manufacturer doubts this information he can set himself right by subscribing to Distribution and Warehousing, a warehouse magazine published at 239 West 39th street, New York. Any dealer may safely pass this information on to any manufacturer who tells him that the long dating system is necessary to handle the winter surplus.

Some successful tire manufacturers have not found it necessary to resort to long dating to move their goods and some of these manufacturers have the co-operation of enthusiastic dealer organizations. There is at least one manufacturer who has stated publicly that he sells his tires only for cash.

Reforms along the line of spring dating and of selling tires to jobbers and mail order houses for less than cost are absolutely necessary if the tire merchandising business is to come into its own. The dealers can have more influence than any other element in this business, by declining to do business with a manufacturer who cannot come clean in his explanation of his business.

Next Week—The Mechanical Phase of the Tire Dealer's Business.

Turnover, Key to Mercantile Success

Tire manufacturers and every other manufacturer knows full well that turnover is the key to mercantile success. Few of the older lines have built up a mercantile representation that is able to finance the warehousing of goods and it cannot be expected that an industry as new as the tire industry should have done so.

So tire manufacturers, in their literature, talk turnover—quick turnover.

Then the tire manufacturer goes to this same merchant and tries to sell him an eight months' stock of tires at one shipment. This is just the opposite of turnover.

As certain as quick turnover is the success of merchandising, so is the long dating idea destructive of successful merchandising.

Bill Fixit's Return

Keeping Up With Dorris Brings in a Car Sale and Bill Gives a Lesson in Testing Switches

By A. H. PACKER

Previous articles in this series were published February 15, March 8, May 3, and May 31, 1923

THE appearance of Dorris Ledding at the Junior Prom in a new Runwell car was the event of the season. Sensation describes it but mildly. The prom faded away as a background, the girl and the car were the talk of the school, the town and the country round about, where events of such importance eclipse the fates of nations.

Sedate touring cars of a year ago, well built sedans, sport speedsters on well worn chassis, all bowed to the new car, or in sulky mood, silently slunk away. The Runwell had come into its own. In the show room it was a fine looking car. With Dorris at the wheel, a bit of heaven on wheels had apparently come to earth.



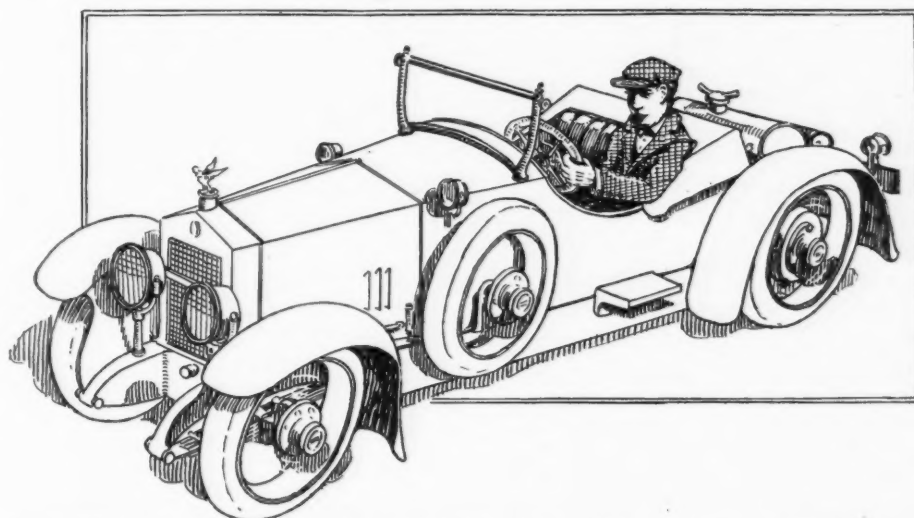
Hilyard Dalton was known as Yardy. The speedster he drove had until now been in a class by itself. Like its master, its bump of self effacement was a noticeable dent, and in brilliant hues it proclaimed to all the world that here was a chariot worth having. With open cutout at 2 A. M. it was alike the curse of sleepy parents and the goal of admiring sons. But human favor is fleeting, the baseball hero of yesterday is the dud of tomorrow and like the other cars, the speedster of Yardy's would have liked to retreat to the refuge of its own ample quarters and hide its radiator where none could see.

Yardy however, was not disposed to retreat so quickly. Faults he may have had, but retiring under fire was not one of them, and besides he must know just what it meant when Hutch, Bill's salesman and ex-grocery clerk, brought the classiest girl in town to the dance. Yardy had liked Dorris fairly well when she had gladly deserted the old Mercurious car in favor of the brilliant speedster. Now that the Runwell car and salesman had captivated her fancy, Yardy's interest had grown with mushroom like rapidity.

Perhaps his anxiety would have subsided had he known that the smile Hutch showed was somewhat forced, his pleasure marred by the thought of Betty there with someone else and his only reason for being there, to watch a new driver at a new job and make sure that on the first night out the new car did not come to grief and react against the favorable impression Bill was making with the Runwell line.



Hezekiah Dalton had come to Westville when land was cheap and farmers were poor. Their crops were scant and



"The speedster Yardy drove had been in a class by itself . . . in brilliant hues it proclaimed to all the world that here was a chariot worth having"

the reason was plain. The elder Dalton saw the need and met it, fertilizer was needed, and Hezekiah became the dealer in earthy nutriment without which crops grow but poorly.

At high prices, but long terms he supplied his neighbors and friends with nitrates for the soil and now he was reaping the benefits of his business sagacity. Yardy had not sown but was strong for the reaping end of the business and the part he liked the best was his Dad's name on a liberal check.

So it happened that the morning after the prom saw Hilyard and his father in wordy combat over the question of a new car, and as always happened after a more or less lengthy debate the son won and bore away in triumph the check that would make a new speed creation the talk of the town. It would be a Runwell chassis of course, but Yardy had his own ideas as to the body that would go on it and as to the equipment he would have. Nickel plated lights would be the outstanding feature and Bill Fixit would have to be consulted right away so that a decision could be reached and the right lamps and switches obtained in time for the installation of the new body on the Runwell chassis.



Betty Jetline was busy at her typewriter. When Hutch came in that morning she had favored him with a curt nod. Betty was on her dignity, and when aroused it was some dignity. After taking her to two or three dances, had he not gone off with Dorris Ledding just because her dad had bought her a new car.

Evidence enough as to Hutch, she would show him, and if the start was an indication she would certainly do a good job.

Interest in the keys of her machine did not keep an occasional glance from roaming to the big front door, and when Yardy appeared for his conference with Bill, she was at the door to greet him. Was it not her job to make customers feel at home? It certainly was and she would attend to business as never before. Nor did the son of the fertilizer king need much encouragement to make himself at home, and an hour passed in describing what the new car would be like before Betty realized that she had better get out some letters if she expected to get the important ones off on the one o'clock train.

Bill had not been ignorant of the social conversation going on in the front office, but he had ideas of his own as to the way that good will is developed, and he waited his time. After an hour however, he decided to interrupt, and walked in to see if there was anything he could do for the son of Hezekiah Dalton. Yardy told him what he wanted, nothing less than a chassis with the classiest special speedster body that a custom shop could produce together with a set of lamps that would make the lights of other cars look like a candle in a strong wind.



As Bill and Yardy talked things over in the closing room, the lad outlined what he wanted in the way of lights on the car. First he said, I want the regular head and tail lights with little special side lights, which will be built in

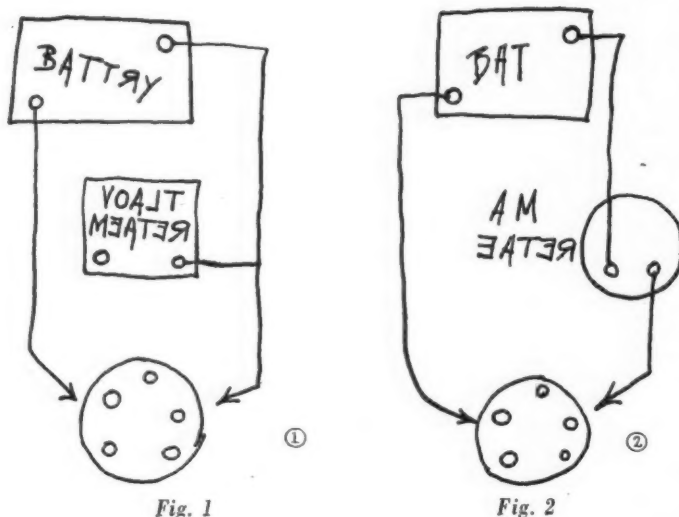


Fig. 1

Fig. 2

The valve grinding fiend makes two switch testing diagrams

the body. Then I want running lights on the sides and a stop light in back and a backing light that will go on when the other lights are turned on and the gear shift lever is in the reverse slot.

"I want a pilot light for the stop light so I will know if it is working, and I want one for the emergency brake lever. It ought to work only when the engine is running, so you won't forget and drive around with the brake set. At the same time of course the light should not be on when the brake is set and the engine not running.

"I heard of a fellow who had a car wired that way, and the light also acted as a warning if he stopped, and pulled up his brake and forgot to turn off his ignition switch. Then I want two spot lights, one on each side of the windshield, and I want one of them to light up automatically when I turn the corner one way, while the other should light when the car is turned the other way. Besides being automatic I want to be able to turn them on with a separate switch on the cowl board. Of course they should not turn themselves on going around a curve in the day time, only at night. Can you take care of a job like that?"

"Wait and see," said Bill, "Leave it to us."



The shop conference was in session. Bill read to them the electrical specifications that Hilyard Dalton had made out for his new sport speedster. Hutch smiled, the Red Head scratched in vain, trying to see the light while the Valve Grinding Fiend stared into space, too overcome for either intelligent speech or expression.

"Don't take it so hard," said Bill, "I don't know how to do it any more than you do, but I have a hunch we can find out, we do not have to figure it all out at once, you know." A sigh of relief was heard, two or three were beginning to sit up and take notice.

"The first thing we will do," said Bill, "is to figure out this switch that Yardy picked up somewhere. Probably selected it because of the preponderance of nickel plating on the plate in which it is

mounted. Really consists of two switches in the same panel, so that ought to simplify the job somewhat."

"I sure hope it does," said Red.

The switch was passed around so that all could see and advance any ideas as to how to proceed. "Its marked on the front all right so the man in the car can tell which way to turn the handle, but without any marks on the back its pretty hard to tell how to wire it up, I should think," said the Valve Grinding Fiend. "Seems to me we will have to take it apart to see how it works."

Hutch Suggests an Electrical Test

"Its somewhat out of my line," said Hutch, the salesman, "but the way its riveted together that would be quite a job, I should think you electrical birds could test it some way to see what connections it makes inside when the handle is turned different ways."

"Hutch is on the right trail," said Bill. "Now suppose we have some suggestions as to how we can test it."

The Valve Grinding Fiend was right there. Even as Hutch was speaking he was busy with the stub of a pencil and

a piece of brown paper and when Bill called for suggestions he had one ready made. Fig. 1 portrays his first effort in solving the shop electrical problems.

"Let's see," said Bill, "B-a-t-t-e-r-y, guess you mean that for a battery, and V-o-l-t M-e-a-t-e-r, oh, I see a voltmeter; you figure on testing with a battery and a voltmeter, good idea—perhaps." Bill handed it to Red to see what he would say.

"Humph," said Red. "Looks like it would short the battery, tell you nothing on the meter and burn up the switch when you did find a circuit, outside of that it looks pretty good, come again Valvy, old top."

Valvy had more enthusiasm than discretion and was right on the job with another sketch in response to Red's suggestion. Fig. 2 shows his second effort to help.

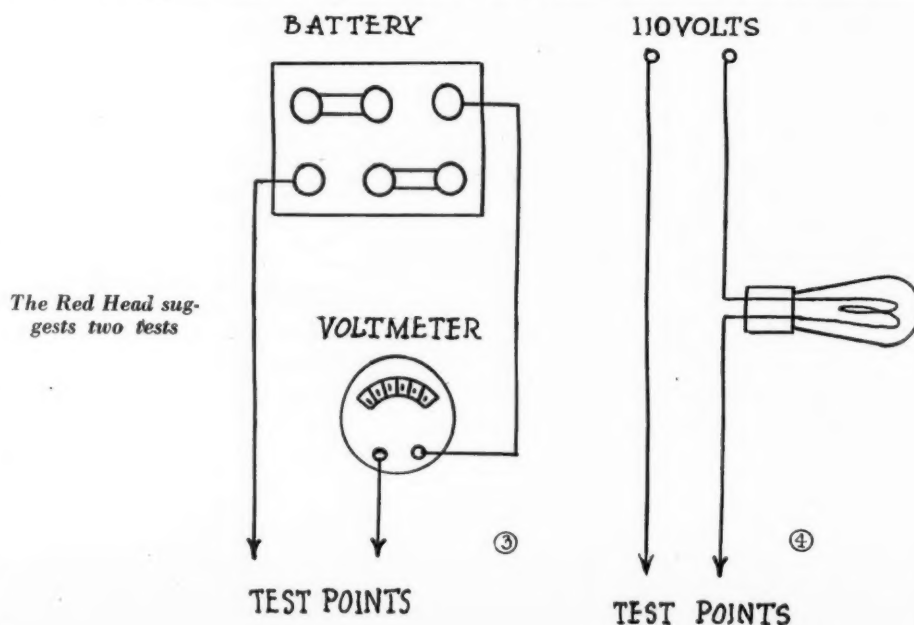
"Oh, I see," said Bill, "you have the meter connected a little differently this time, but think an ammeter will do the trick better. All you have done this shot is to fix it so that you will burn up, not only the switch but the meter as well. Say, Red, have you got our shop test meter thoroughly locked up?"

Bill laughed at Valvy. "Better listen in a bit longer, and get things a little straighter. You have gone just far enough in the juice business to be dangerous. We'll keep you on the engines for a while yet, where you know the ropes better."

Valvy grinned and subsided.

"Now Red," said Bill, "I think its your turn." So the Red Head produced two sketches and handed them to Bill. Fig. 3 and Fig. 4 show the ideas advanced for testing the unknown switch.

"Not so bad," said Bill. "With these tests you can not do any harm. In one case you get battery voltage showing on the meter when you get a circuit, and in the other case the 110 volt lamp lights up. I hate to be so critical but there is one possible case where these tests are not so good. That is when you have an old switch where the contacts are dirty



The Red Head suggests two tests

and corroded and a connection is made but it is not a good one. These tests will not tell you whether the contact is good or not.

"In Fig. 3 so little current is needed to give an indication on the voltmeter, that you will check the switch as apparently O. K. when the contact is not good enough to let two or three amperes through for the lights. In the other case the 110 volt current is so strong that it will overcome a resistance in the contacts which the 6 volt battery will not be able to overcome.

Bill Shows the Best Switch Testing Circuit

"I hate to be always slipping one over on you boys, but if you want a switch to carry current for the lights, the logical way to test it is to make it do just that very thing. In Fig. 5 we use the battery, just as Red suggested but we use a six volt lamp bulb in place of the voltmeter. Then we neither have the high voltage of the 110 volt circuit to fool us on a bad switch, nor do we have a test that is too delicate.

"Using this test of Fig. 5 we will now check up Yardy's switch from the rear view which is shown in Fig. 6. As the terminals are not marked we will make a sketch on which the terminals are located in the same relative places as on the actual switch and give each terminal a label.

"The terminals on the square part of the switch we will mark A, B, C and D while on the round part we will mark the terminals 1, 2, 3, 4 and 5 so that we do not confuse the two sets. From Fig. 7 showing the front of the switch, the square portion appears to consist of two separate gangs."

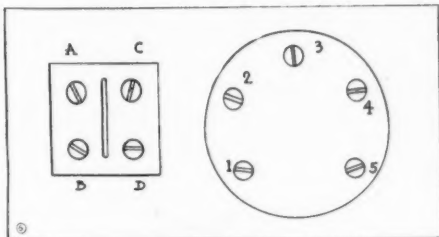


Fig. 6

Rear of the switch that Yardy brought in

In testing, this proved to be the case, for with the button pulled out, the test lamp would light up when the test points were touched at A and B or at C and D, but there did not seem to be any connection between the terminals at the left of this square switch and those at the right.

"Now we come to the interesting part of our test, where we have five terminals and no idea as to where the connections are made, and I wonder how many of you know how many possible tests we can make on these five terminals." The guesses were varied.

"Well," continued Bill, "let's do the job systematically. We can test as follows:

- 1 to 2,
- 1 to 3,
- 1 to 4,
- 1 to 5.

BATTERY

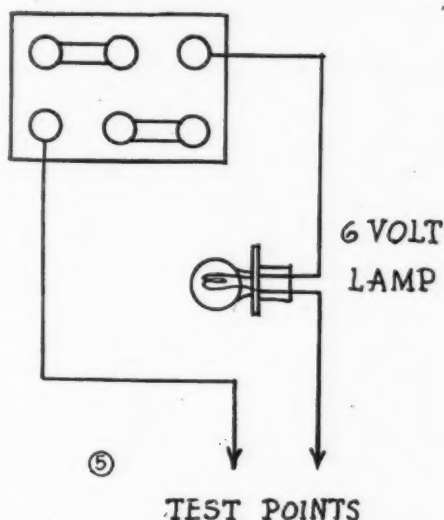


Fig. 5

Bill's test circuit for checking switches

That's all the possible tests on terminal No. 1. Now we take terminal No. 2 and as we have already tested from 1 to 2 we can forget No. 1. We then have

- 2 to 3,
- 2 to 4,
- 2 to 5.

Then in the same way we should test from

- 3 to 4,
- 3 to 5,
- and 4 to 5.

"That finishes the possible tests and we find there are ten in all with five terminals. Then there are two "on" positions of the lighting switch and one of the ignition key so we have what appears to be forty tests to make if we do a thorough job and test in the "off" position also."

With the eager shop crowd hanging around the table, Bill started out on his forty test stunt on the switch, first having the lighting switch handle in the off position and the ignition key out of the switch. Going systematically over the ten tests he found no circuits, as indicated by the lamp failing to light up. That was to be expected with everything turned off.

Valvy Opens His Mouth and Puts His Foot in It

Next the ignition key was inserted and in making the tests on the various terminals, a circuit was found between 4 and 5. As the lamp lit up, Valvy said, "I bet you connect the battery wire to No. 4 and the ignition coil wire to No. 5."

"Better wait until we make some more tests," said Bill. "You're always jumping at conclusions."

With the lighting switch handle turned to the BR position connections were found from 1 to 3, from 1 to 5 and from 3 to 5 so that apparently 1, 3 and 5 were all connected together. In the Dim position in similar manner it was found that 1, 2 and 5 were connected so that tabu-

lated, the results, were as follows:

Switches off—No connections.

Ign. Key in—4 to 5,

Lights Bright—1 to 3 to 5,

Lights Dim—1 to 2 to 5.

"Now," said Bill, "How are you going to use that information now that we have it, to connect the switch right?" Hutch was first to answer. No. 5 seems to be the most popular terminal, and as the battery terminal has to be in on every connection whether it is current to ignition or lights, suppose we call No. 5 the connection for the battery current coming from the ammeter.

"Fair enough," said Bill.

"And the tail light has to be on in every active position of the lighting switch," said Red, "so it would seem as if No. 1 would have to be the tail light terminal."

"That leaves No. 2 and No. 3," said Bill, "And as we get No. 2 in the Dim position we better use it for the side lamps and No. 3 for the head lamps, then we will be all fixed up on the standard part of the wiring.

"The rest of the wiring," said Bill, "is a little bit fancy, you do not get jobs like that every day in the year." But the shop gang were not to be put off that way, they wanted to see the job finished.

"All right," said Bill, "I'll let Red tell us how he would finish the job." So the Red Head who was Bill's right hand man in charge of the electrical department proceeded to figure out the rest of the diagram.

"The running lights are easy. We can fix them up with a separate switch. The stop light is not new, we have been putting them on cars for the last year or so, but we do not always put a pilot on. In fact a pilot light can not be put on right for it should be in series. A light of high candle power however, is needed in back while a small bulb is needed on the cowl board, which leaves the series wiring out of the question for the bulbs have to be alike in a series circuit.

"That means we must connect from the ammeter, where we pick up the battery current, to the switch which is operated by the brake pedal. From the other

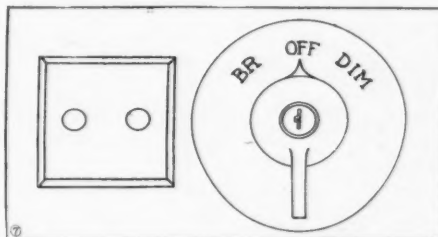


Fig. 7

The front of Yardy's switch

side of this switch, however, we connect two wires, one to the stop light and the other to the pilot. The pilot is then O. K. as far as telling whether the switch is working, but does not tell us if the rear bulb burns out for if the

wire breaks from the switch to the stop light socket.

"When we come to the backing light we want it arranged so it will not turn on every time the gear shift lever is in reverse, but only when the other lights are turned on. That means that we want to connect it to the tail light terminal of the lighting switch instead of to the ammeter. With a wire running to the backing light it would light up when ever the tail light was on if we used a grounded lamp. That means we need a two wire lamp with the other wire running to the transmission, where the gear shift lever must complete the circuit to ground when in the reverse slot.

"The pilot light, to tell when the ignition switch is on and the emergency brake lever pulled up, will be connected similarly. Instead of hooking it on to the tail light terminal however, we will connect it to the ignition terminal. We will also need a two wire socket, for one will have to go to the emergency brake lever to have the circuit completed to ground when the lever is pulled up.

"The scheme in regard to the spot lights at the side of the windshield is a rather wild one, but there is no reason why the motion of the steering arm can not be made to work a couple of switches, just as the brake pedal works the switch for the stop light. Then to make it possible to turn on the spot lights at will we can use the square part of the switch that Yardy brought in, and connect these two gangs in parallel with the switches worked by the steering arm."

In turning to the left the drag link will move forward and the switch shown at the right of the steering arm will be closed. This will turn on the right spot light when turning left, and the left one when turning to the right.

As Red was explaining the circuits needed, Bill was busy with a ruler and pencil, and as Red finished he held up a sketch shown in Fig. 8, the complete lighting diagram for Yardy's special.

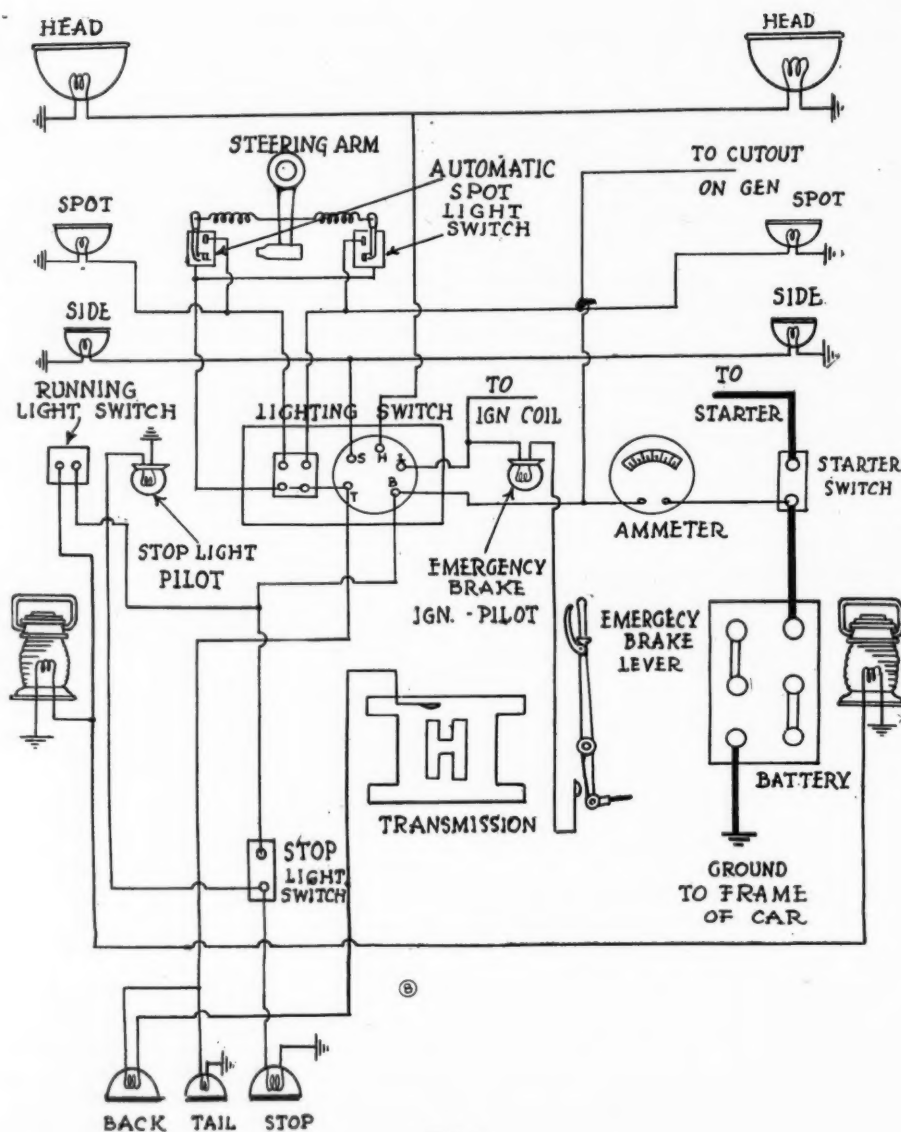


Fig. 8

A lighting diagram for heads, sides, tail, running lights, stop light and pilot, backing light, pilot for emergency brake, and spot lights with both hand operated switch and switches automatically operated by the steering arm

23 Years Ago This Week In MOTOR AGE

(From MOTOR AGE of July 5, 1900.)

Notes From Germany

BERLIN, June 19 (1900)—Herr B. Loutzky, the director of the Berlin company of automobile carriage builders, has been called to Paris by the German Imperial Commissioner to organize the German motor car department of the exposition. Count Talleyrand-Perigord, who is German in spite of his extremely French nomenclature, has been even more honored, for the Minister of Public Works at Paris has appointed him a member of the jury for division VIII of the exposition, traffic.

The Bavarian Automobile Club intends to popularize automobilism in Munich

by processions through the capital on stated days of the month.

Vienna has its first electrical omnibus, for on June 14 this conveyance was placed on the streets and at once stormed by people eager to boast of their having ridden in the "motor."

Baron Arthur de Rothschild arrived in Hamburg, Germany's most fashionable watering place, on Whit Monday, having left Paris on his motor on the preceding day. The Baron rode the distance in 16 hours via Strassburg, Heidelberg and Frankfort-on-the-Maine.

One of Many

COLUMBUS, O., July 2—The Wells-Meeker Motor Vehicle Co. of this city has been incorporated recently with a capital stock of \$20,000 by G. W. Meeker, F. E. Wells, D. E. Daniels and W. G. Wells.

In the Want Ad Column

WANTED—To rent with privilege of buying motor vehicle suitable for com-

mercial traveler steam or gasoline. Send circular and quote price.

Making Progress at Washington

WASHINGTON, June 23—Gradually the automobile is assuming a position of importance in the commercial life of the national capital. Several hotel proprietors have lately been experimenting with automobiles with a view to substituting them for horse-propelled vehicles running between the hotels and the depots. The department stores are also experimenting with automobiles in the delivery of goods and it is proving a good advertisement for them.

An investigation and cleaning up of unfair and dishonest battery advertising has been undertaken by the Vigilance Committee of the Associated Advertising Clubs of the World which promises to be of great benefit to the automotive industry. The full text of the committee's statement will be found on page 49 of this issue.

French Grand Prix Attracts Cream of French and British Racing Creations

TOURS, France, July 2—The Sunbeam car, driven by Seagrave, won the Grand Prix race here today. This car completed the 35 laps of the course, totaling approximately 496½ miles in six hours, 35 minutes, 19 4/5 seconds. The average speed of the winner was 121 1/5 kilometers an hour, which was 6½ kilometers slower than last year's time. A Sunbeam, driven by Divo, was second, and a Bugatti, driven by Fredericks, was third. A Sunbeam, driven by Lee Guinness, was fourth.

ORIGINALITY in plenty is to be found on the 18 cars representing Bugatti, Delage, Fiat, Rolland-Pilain, Sunbeam, and Voisin, to start in the 122 cubic inch French Grand Prix road race, at Tours, on July 2. This is the second race to be held in France under this piston displacement rule, the first one, in 1922, on a road course near Strasbourg, resulting in an easy victory for Fiat, with an average speed of nearly 80 miles an hour.

While Fiat stands out as favourite, the probabilities are that the Italian cars will not walk away from the field as was the case a year ago, for the preparation is much more advanced than in 1922. The Fiat engineers, Fornaca and Cavalli, have abandoned last year's successful six cylinder racing cars for eight cylinder in line models. This change was not unexpected, for last year six cylinders were used merely because of commodity in construction, and to save time. Since it began experimenting on small piston displacement racing engines the Fiat Company has always preferred the eight to any other number of cylinders.

This year's Fiat models are a development of the design which has been followed for the last four or five years. The cylinders are separate steel forgings having a stroke of 2.36x3.445 inches, united into two groups of four by welded-on sheet steel water jackets. There are two valves in the head inclined at 42 degrees, and operated by a couple of overhead camshafts with drive from the rear by a vertical shaft and bevel gearing.

One of the outstanding features of the engine is the use of roller bearings for the crankshaft and the connecting rods. Fiat was the first to experiment in this direction, and in order to get satisfactory results found it necessary to build the bearings in its own shop. These gave complete satisfaction last year, and have been continued on the new models. There is a bearing between each cylinder and one behind the timing gear, giving ten in all for the crankshaft. The rollers are in direct contact with the shaft, and the connecting rods are split type with two bolts.

According to very reliable reports, Fiat will use a supercharger in the race. Up to the present Mercedes is the only

European firm having given attention to supercharging on racing engines. Other firms entered in the Grand Prix, while admitting difficulty in completing filling the cylinders at the high number of revolutions, have not attempted to get the charge in at higher than atmospheric pressure.

A dry disc clutch is used. The gearbox, which forms a unit with the engine, comprises four speeds and reverse, with the change speed lever on the top of the box. The steering gear is bolted to the front face of the right hand rear crankcase hanger. A pressed steel combined axle housing and torque tube, of the same general type as used on standard cars, is employed, with drive taken through a spherical head received on the rear face of the gearbox. Wire wheels with straight side tires are used. Springing is by semi-elliptics front and rear, supplemented by Hartford shock absorbers. Brakes are applied on all four wheels, with the use of a servo mechanism. Track is 47 ins. front and rear, wheelbase 103 ins. and weight empty, 1455 pounds.

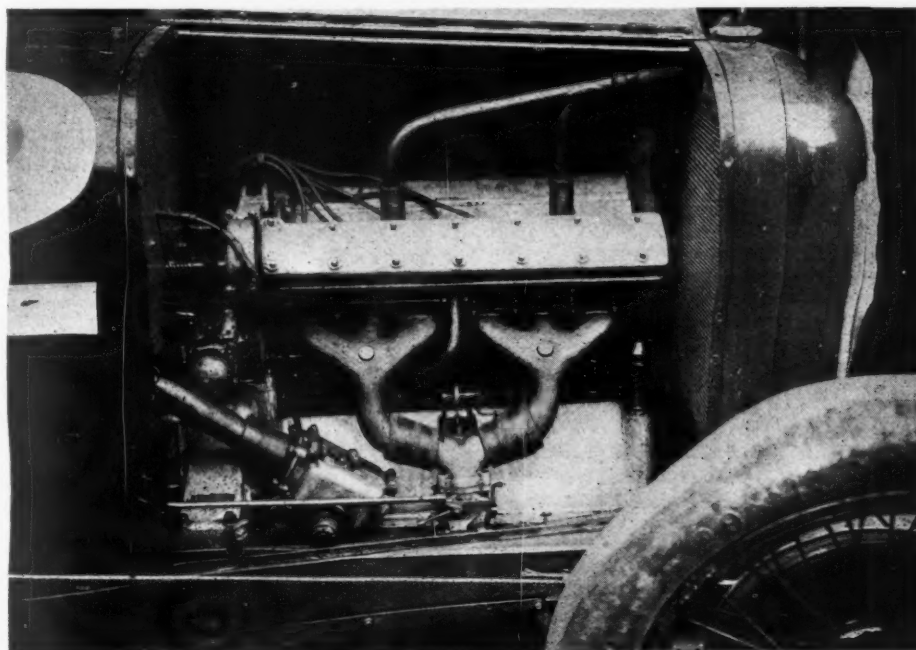
Sunbeam Enters New Six Cylinder

Sunbeam this year is racing with new six cylinder cars designed by Engineer Coatlen. There are many points of resemblance between the models produced by this British firm and the Fiat cars of last year, the explanation being the presence on the Sunbeam technical staff of Engineer Vincent Bertarione who until a few months ago was a member of the Fiat racing department.

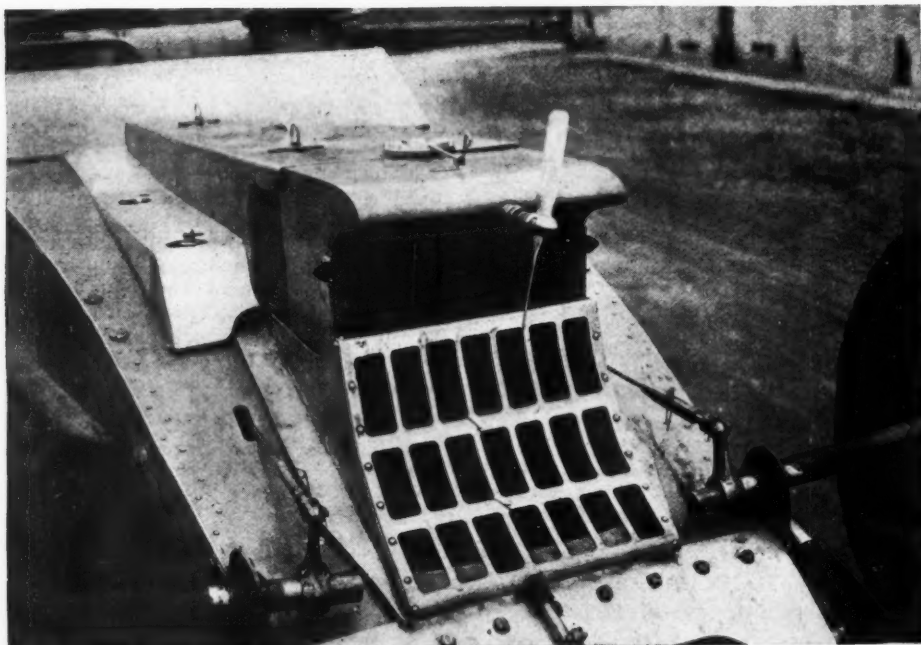
The six cylinder Sunbeams have separate steel cylinders machined out of the billet with a bore and stroke of 2.64x3.7 inches, with two valves inclined in the head, two overhead camshafts, and camshaft drive from the rear by spur gearing. The compression ratio is 7 to 1. Like the Fiats, they have roller bearings throughout, there being eight bearings for the mainshaft, and split ends for the connecting rods, with the rollers in direct contact with the shaft. Roller bearings are also used for the two camshafts. Ignition is by high tension Scintilla magneto, with variable advance of the armature and a single plug per cylinder is used. Lubrication is of the dry sump type. A single Silex carburetor will be adopted for the race.

According to the statement of the Sunbeam engineers, the power output is 108 at rather more than 5000 revolutions. In this connection it is interesting to recall that the Fiat engineers have issued details of their last year's engine, according to which the maximum power was 95 at 5200 revolutions. This engine had a bore and stroke of 2.56x3.94 inches and the following timing: Intake opening, dead center; intake closing 55 degrees after lower dead center; exhaust opening, 50 degrees advance; exhaust closing, 10 degrees lag. Ignition advance, 60 degrees.

The Sunbeam engine is unit construction with clutch and gearbox, the whole having three point attachment to the frame. Clutch is cone type with ferodo



The influence of Italian design is seen in this British Sunbeam. It is almost identical in external appearance with the six-cylinder Fiat of last year. This is probably explained by the fact that Sunbeam has recently hired one of the former Fiat engineers



The weight of the car complete is just over 1400 lbs. The front spring hangers are just one instance of Voisin's use of sheet steel built up welded fittings as used in airplane construction. The gasoline tank is mounted in front just below the radiator. We don't know the purpose of the small propeller, but think it might be for the fuel pump drive

lining. There are four speeds and reverse. The drive shaft is open type with two universal joints. The front axle is built up in three parts, as on last year's cars, the centre portion being of I-section and the two end parts of circular section. Brakes are fitted on all four wheels and are applied through a servo mechanism.

Track is 51 ins. at the front and 47 ins. at the rear. Wire wheels with Dunlop straight side tires are used. Weight of the cars is given as about 1450 pounds empty. Undoubtedly the Fiats and the Sunbeams will be the two fastest cars in the race. While data under this heading is not particularly reliable, 118 miles an hour have undoubtedly been attained by both firms and there is reasons to believe that the maximum speed is somewhere in the neighborhood of 124 miles an hour.

Voisin Cars Feature Streamlining

Gabriel Voisin, aviation engineer and automobile builder, undoubtedly will present in the Grand Prix the set of cars showing the greatest departure from standard practice. A year ago Voisin won the French limited fuel Grand Prix road race, and when the rules for the 1923 edition of this contest came out he severely criticized the clauses making it impossible to do any original work on the body lines. With a view to proving that more could be gained by a scientific study of the external lines of cars than by increasing the engine output, he entered a set of four cars in the 122 inch race and laid himself out to build the most perfectly streamlined cars ever seen.

The engine is a six cylinder of the Knight type, but not built under Knight patents, for these are no longer valid in France. The cylinders which are in

one casting, have a bore and stroke of 2.44x4.35 inches. Compression ratio is slightly more than 7 to 1. Unlike any of the other engines in the Grand Prix race, ball or roller bearings are not used for the crankshaft. The engine, however, is of the high efficiency type, produced to the designs of Andre Lefebvre, a young engineer who was responsible for last year's racers, and who will take the wheel in the coming race.

It is declared that the engine will be utilized at 5000 revolutions. There is a very good power output at 3000 revolutions however, and acceleration is

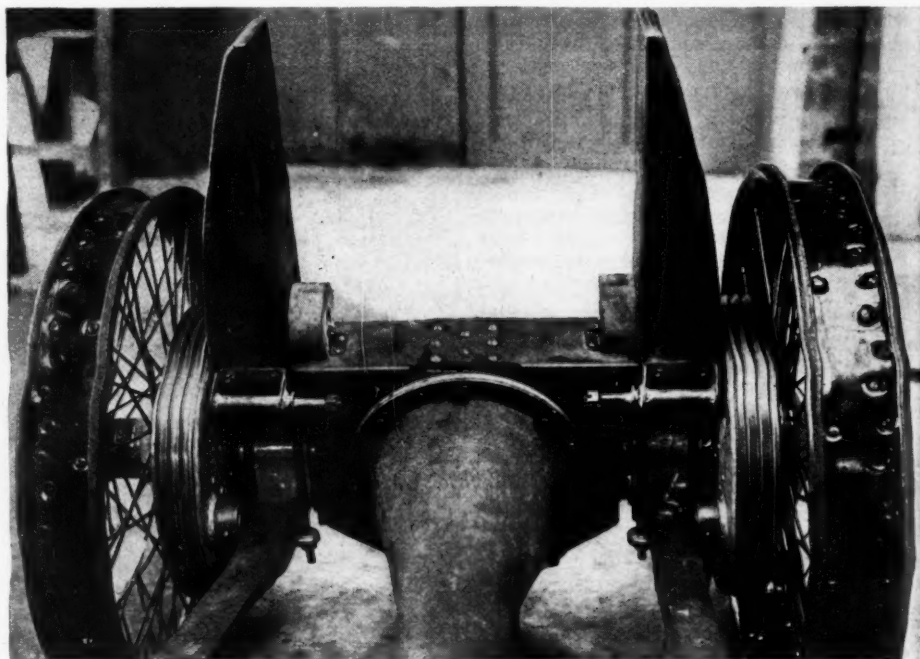
claimed to be remarkably good. Among the outstanding features of the engine is the use of magnesium pistons of the slipper type with detachable cast iron skirts held in position by a shoulder which fits into the piston groove and are prevented from turning by a stud.

It is claimed that with this design all the light weight advantages of the magnesium piston are obtained without any of the dangers of the metal disintegrating through contact with the cylinder walls. The rods are of almost oval sections, hollow, and have split ends with white metal lining. Lubrication is forced type with all the oil outside the engine, one pump delivering the lubricant to the bearings and another scavenging the base chamber.

The engine, clutch and gearbox constitute a unit on which the radiator and all the brake control gear are mounted. The timing gear housing is cast with a platform on which the radiator is carried. The change speed lever is on the top of the box and the brake control mechanism, with independent adjustment for front and rear sets is also mounted on the gearbox. Naturally the clutch and carburetor controls are on the engine unit.

Aviation Practice Followed

Aviation practice abounds not merely in the design, but in the various details of construction of these original cars. Gabriel Voisin's object appears to have been to produce the nearest possible approach to a deep section airplane wing, with an absolutely flat surface, a fine entering edge, and the deepest section just a little behind the centre line. At the front normal 54 in. track is used, but at the rear the track has been reduced to 30 in. and the driving wheels are recessed in the body.



The frame construction of the Voisin eliminates side rails and the vertical posts are used as guides to prevent sideways movement of the springs and body assembly

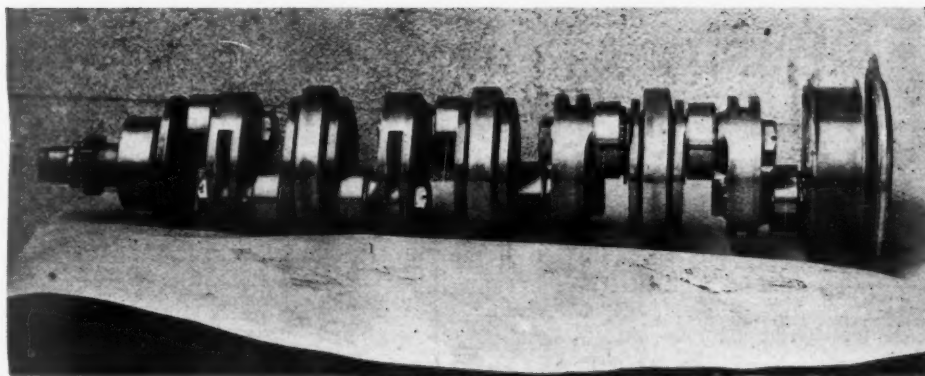
The Voisins have no chassis frame members. The body is built up in the same manner as an airplane fuselage of wood, pressed steel members and sheet aluminum panelling. Two steel tubes give the necessary transverse rigidity and carry the powerplant, which, as explained, includes the radiator, all the brake control gear and also, on the rear face of the gearbox, the housing for the spherical head of the troque tube.

With a rear track of only 30 in., no differential is used. It has been necessary to guide the rear axle against lateral movement, and this has been secured by means of two square section steel posts welded respectively to the upper and the lower faces of the axle housing and moving in two vertical tunnels built in the body of the car. Vertical movements of the axle, through the semi-elliptic springs, is unhampered, but by reason of the two axle posts and the tunnels it is impossible for the axle to move laterally.

It was expected that Voisin would completely enclose his drivers. This has not been done, but they are placed so low that they offer no resistance. The portion of the body in front of the crew that to the rear of the men is slightly slopes down to the entering edge, and above their heads.

It had been intended to enclose the front axle, springs and shock absorbers, but lack of time has made it impossible to do more than streamline each member. The oil tank is in the entering edge, in front of the radiator, which stands out slightly above the level of the body. The engine base chamber is dry. Total height of the cars is 40 inches. The clearance is less than six inches and is only just sufficient to enable the cars to run on the road without striking if a tire is shed.

These probably will be the lightest cars in the race, just coming within the



The Rolland Pilain, built-up crankshaft, in 13 parts, with five ball bearings and roller bearings for the connecting rods

weight limit of 1433 pounds. While the general design tends towards lightness, the fact that construction throughout follows much more on aviation than on automobile lines, with an immense amount of steel tubing, light steel pressings, acetylene welding, aluminum and duralumin parts, also tends to a reduction of weight. It is claimed that one of the normal 10 h.p. Voisin chassis was experimentally streamlined like the racing cars and the speed increased from 60 to 85 miles an hour.

Rolland-Pilain Uses Last Year's Eight

Rolland-Pilain this year is racing with the eight cylinder models which ran a year ago. The positive valve operating mechanism has been abandoned however, in favor of the more normal system of closing by coil springs, steel liners inside the aluminum cylinders have been replaced by iron liners, and magnesium pistons are used.

Cylinder dimensions are 2.335 by 3.54 inches. Unlike the others, an iron detachable cylinder head is used and is bolted to the aluminum casting carrying cylinder barrels and crankshaft. With

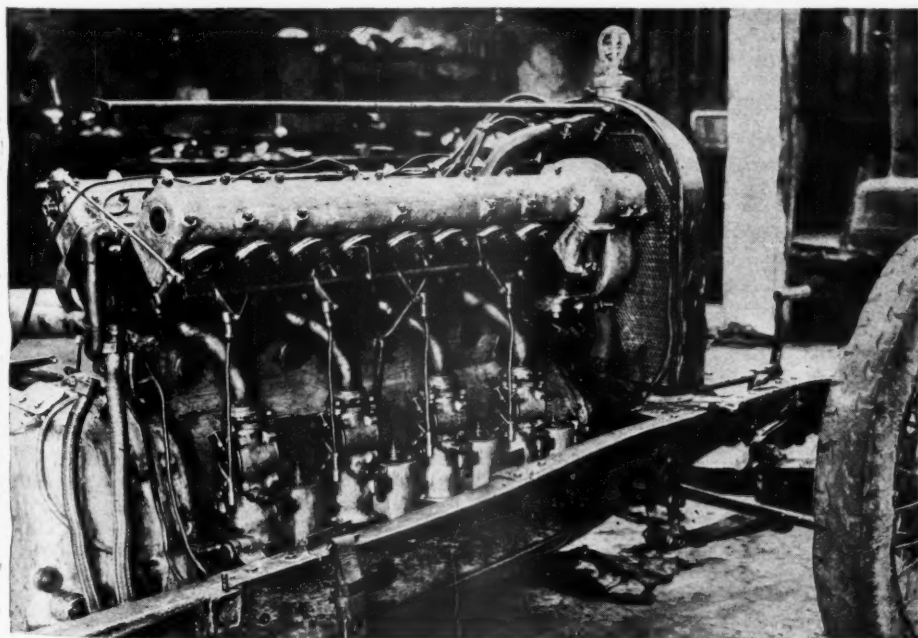
the two valves per cylinder inclined in the head at 45 degrees and the aluminum housings carrying the camshafts, the engine externally looks like a V-type.

The built-up crankshaft in 13 parts, with assembly by cone, is carried in five S. R. O. ball bearings, and has roller bearings in cages for the connecting rods. These latter are tubular, with split ends united by two bolts. The camshaft drive is at the front by spur pinions. Last year battery ignition was employed, but this year use is made of a Scintilla magneto mounted cross-wise and driven from the front end of the exhaust camshaft. Four Zenith carbureters are used.

Engine and gearbox are a unit attached by three points to the frame members. A peculiarity of the rear end is that the axle is above the frame members, these latter having a downward slope towards the rear. Track is 44 ins. at the rear and 51 ins. at the front. Rolland-Pilain is making use of four wheel brakes with hydraulic operation at the front and mechanical control at the rear, the four however, being controlled by one pedal.

While two of the Rolland-Pilain cars have a poppet valve engine as described above, the third machine, to be driven by Jules Goux, is equipped with a six cylinder cuff valve engine built under patents held by the S. R. O. Ball Bearing Company. This car should have come to Indianapolis, but was only finished just in time for the French event. Much of the detailed work on the engine has been entrusted to Ernest Henry, the Swiss engineer who earned fame as the designer of the Peugeot racing engines, and was later responsible for the Ballots. The entry has been made with the sole object of proving the value of the cuff valve design. It is declared that the engine has been run on the bench at 6000 revolutions.

The decision to race having been taken at a late date, Delage is running with only one car, a 12 cylinder V-type. Two different types of engines have been built, one having roller bearings for the crankshaft and the connecting rods, the rollers being in direct contact with the shaft, as in the case of Fiat and Sunbeam, and the other having plain bearings throughout. The probabilities are that the roller bearing engine will be used. Bugatti is running with a set of new straight eights.



The eight cylinder Rolland Pilain carries two camshafts, but it is stated that the positive valve closing mechanism has been abandoned in favor of the conventional coil spring and single cam mechanism. The engine shown has conventional valve mechanism

Business That Floats on Tires and Gas

With a Substantial Accessory Business as a Foundation, the Sawyer Boys of DeKalb, Ill., Built a Car Salesroom and Shop

ROLLING along the highway with a growing conviction that the load in the gasoline tank is becoming unduly small, you glance right and left and pass a gasoline station here and there before you know it. Should you, however, by chance, come to the gasoline service station of Sawyer Brothers you would know you had reached the appointed time and place to replenish your fuel supply.

Not only does the wide entrance present an inviting appearance, but the courtesy of the attendants is well in keeping with the appearance of the building itself.

"To what do you attribute your success," one of the Sawyer boys was asked, and his reply was, "Courtesy and service." "If we get a call from someone in distress with an empty gas tank, we go to him if we have a man left at the station. We may lose money on that particular occasion, but the gain in good will in the community is something that cannot be estimated."

The two Sawyer brothers, operating under the name of Sawyer and Sons, at DeKalb, Ill., have built up a business which would be a credit to many establishments in much larger localities. "In the matter of accessories," said one of the Sawyer brothers, "We carry everything except some parts needed in a repair shop. On the one item of fan belts for example, you only have to look at the belts on that big post, to see that



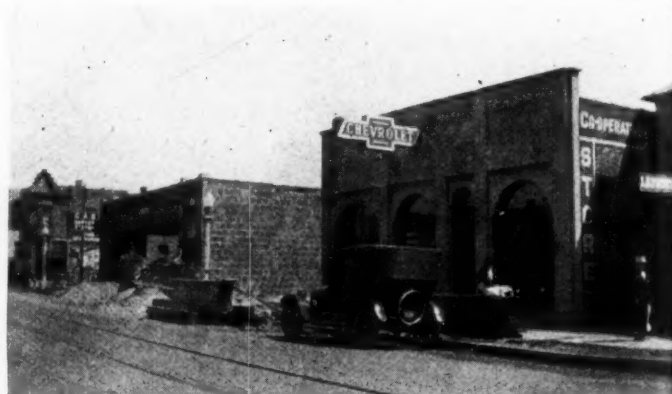
we have them of all styles and sizes, while the visible stock of tires on those racks, represents only a quarter of the stock we carry.

"How did you select the brands of tires," was the next question asked. "We considered our trade, and the standing of the various tires," was the answer.

"The more influential car owners want a tire in keeping with the quality of the car they drive. For this class of trade we took on one of the much advertised, well known high quality tires. Then we had to consider the drivers of medium and low priced cars who wish to buy a tire that will give good service,



The salesroom was started from the proceeds of the accessory store



Sawyer & Sons service station at DeKalb, Ill.



The roadside salesroom needs more than a "Cracker Jack" salesman to make a go of the tire business



"Need a fan belt? We have all types and sizes"

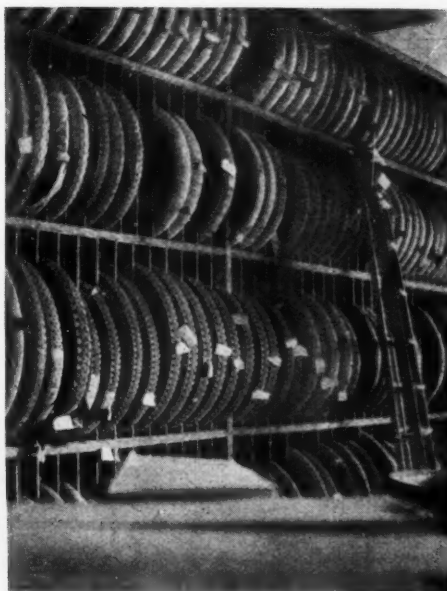
but demand this service at a lower price. That decided us on another well known tire made by one of the oldest companies in the business. We have concentrated on these two lines only."

While tires and other accessories occupy the front of the store, the rear contains a small vulcanizing shop where repair service may be promptly rendered to customers, and it is a common occurrence to see a car drive in for gas and at the same time have the vulcanizing department, extend its services to a casing or tube in distress.

The lure of seemingly large profits has led many an automotive merchant to sell cars, perhaps following it later with a line of accessories. Sawyer brothers have worked on the reverse plan.

Recognizing the relative stability of the accessory business, they established that first and built it up to a paying basis. When the sale of small items was totaling amounts that many a car dealer might well have envied, they diverted some of the profits, and with them built a salesroom, taking on Chevrolet cars. Now that the accessory store and the salesroom are both doing a good business, they have started work on a new building which will be devoted to maintenance work.

Sound business forethought has characterized the activities of the Sawyer brothers in their automotive business. The gasoline situation is a typical example. Located on the main highway, they are also in a live automobile center and at the same time within a hundred yards of the railroad, which crosses the highway near the gasoline station. Their underground tanks have feed in pipes run across the street to the railroad track so that gasoline can be purchased



"New tires, yes, but that's only a quarter of the stock we carry," said a salesman, "and we get a good turnover"

in carload lots and sold at retail. The advantage of this plan needs no further comment.

Sawyer brothers appreciate the opportunity presented by the touring season, and by their facilities and the appearance of their place, pick up business that slides by the smaller places.

"While there is undoubtedly a chance for the sale of tires and accessories at the small roadside shops, which in many cases are outgrowths of an ice cream parlor, still there is little opportunity of rendering service to any appreciable extent. At one such place a small boy was in front playing with a rifle. He was asked if they sold much in the way of automobile equipment and replied,



Tires in the vulcanizing shop, repaired, or awaiting their turn

"Oh, yes, quite a bit, but now dad is looking for a job." The sales were apparently not unduly heavy.

At such a roadside shop, prices may be right and quality of the best, but the prospective purchaser at one of these places knows that there is no service available for him after a purchase is made.

Service and courtesy are needed to back up any selling plan, and reinforced with right business methods and the sale of legitimate merchandise, they spell success.

DAN'S DIARY

JULY 5—Gee whiz 4th of July aint wot it ust to be. No fun atall just pumping gas all day and fixin things for boanheads that dont no even when a spark plug is of and lookin out that kids dont thro fire cracklers in the gasoline or shoot roming candles and sky-sockets into the shop till about 12 oclock at night and all your friends gone to picknicks and races and even the Post office closed up.



Four million cars musta went past hear yestiday all loaded full of peeples and lunch and camp stuff till there wasent room even for a rabbit and out on the bad stretch of

road this side of Joneses corners there musta been a dozen cars with busted springs and wheels. They was telefoning in here all day beging us to help them and Gee Whiz wot could we do us going nip & tuck all day as it was. Wot we auto have is a truble wagon which when they called up me or Art could go out in it and get them then you could take your time fixin them up.

JULY 6—This is a funny business with all the rush we had on the 4th here we are 2 days after with just barely enuf to keep going. Seems like if a guy hurys he works himself out of a job and if he don't hurry things pile up on him. I sais to Art gee Art I wist things was a little stedier so a fellow would know whether he was going to go home to supper or work all night. Anyhow i wont half to work to night and im going to see my girl if she aint gone out with Charly Hooker which i cant blame her if she has me not treating her very good and him being much politer than me and wearing nicer close cuz he works in the dry goods store but not noing very much.

MOTOR AGE'S PICTURE PAGES



When Thomas A. Edison recently visited his old shop on Fifteenth Street, New York, to look over the scene of his earliest experiments, he also inspected the automobile built by Leon Mendel at the time when Edison started his experiments with electric lighting, more than 40 years ago



Here is a real action picture of Orile Steele, of Patterson, N. J., winner of the recent hill climbing contest at Delaware Water Gap, Penn., taken just as he was reaching the top of the 70 per cent grade after a climb of more than 300 feet



Derby Day at Epsom Downs, saw a great gathering of motor cars bringing the race fans from all over England to view the famous horse racing classic. The tops of busses were popular with many and served well as grandstands. At the left can be seen one of the many streams of traffic which filled all the roads on the way to the race course

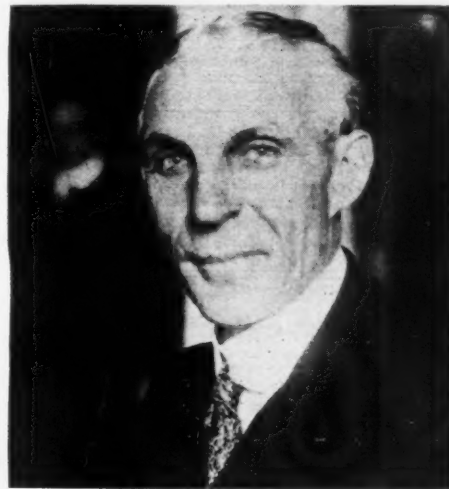
OF AUTOMOTIVE INTEREST



Automobiles were able to navigate the streets of Beaumont, Texas, in spite of the flood which resulted from the recent record rainfall of 12 inches in that city. From this photograph one can see that pedestrians were "out of luck" unless they could get hold of a boat or were willing to wade in water above their knees

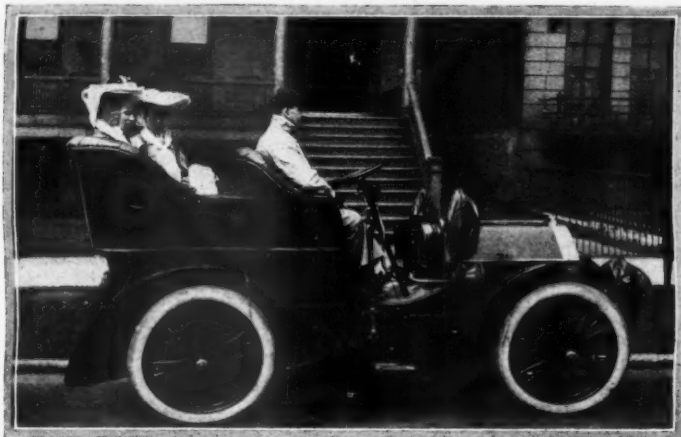


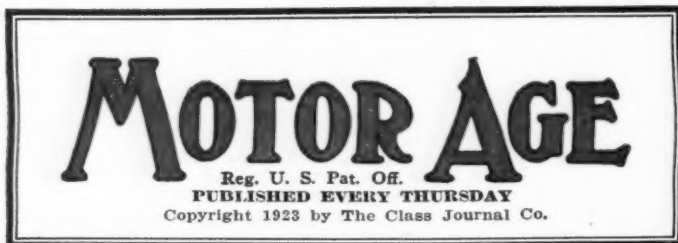
An up-to-date typewriter salesman's equipment will now include a specially built car according to the Paxton Typewriter Co., of Bloomington, Ill. This company designed the automobile body here so that their salesmen might not be forced to either sell typewriters from the catalog or trust sample machines to the tender mercies of the well known "bag-gage smasher"



Henry Ford and Edsel, his son, who is to have control of the Ford business. He will draw a salary of \$150,000 a year as President of the company

An old, rear entrance tonneau Pierce Arrow on Michigan Avenue in front of the Chicago Automobile Club. Note how the lamps are covered, though the passengers have no protection. When this photograph was taken there may not have been another car in sight, now thousands of cars pass this point every hour





Vol. XLIV

Thursday, July 5, 1923

No. 1

THE CLASS JOURNAL COMPANY

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SUBSCRIPTION RATES

United States, Mexico and U. S. Possessions.....	\$3.00 per year
Canada	5.00 per year
All Other Countries in Postal Union.....	6.00 per year
Single Copies	35 cents

Subscriptions accepted only from the Automotive Trade

Owned by United Publishers Corporation, Address 239 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; A. C. Pearson, Treasurer; Fritz J. Frank, Secretary.

Entered as second-class matter Sept. 19, 1899, at the post-office at Chicago, Ill., under the Act of March 3, 1879.

Member of Associated Business Papers, Inc.

Member of the Audit Bureau of Circulations.

Neglected Opportunities

AUTOMOBILE painting is a considerable problem everywhere. In the cities the complaint is that the prices for repaint jobs are too high, that the owner is deprived of the use of his car for too long a period, and so it goes. An analysis of the repaint shops in the cities indicate that the prices are not too high for the time, materials and space required and that the owner is not deprived of the use of his car longer than he needs be for a quality paint job.

So there is little hope unless a new method is employed.

In the country the complaint is as to the quality of the jobs turned out, the prices and the time required. An analysis brings out that the objections to the quality of the job is usually well founded and sometimes that the price is entirely out of line.

The trouble with the rural jobs is that the painter is too often a house painter turned automobile painter. This cannot produce quality work unless the house painter will forget his former craft and learn the new craft. There are means of his learning, if he will look for them.

There is a remedy that dealers everywhere can take advantage of. There is little need of repainting a car unless it has been in a fire or an accident if proper steps are taken to revarnish the job at the proper time. Before any material number of cracks appear on the original varnish, the car should be revarnished. Then once a year

it should go to the varnish shop. This treatment will protect the original paint and keep the color good. A varnish shop is not expensive, a few drying windows and a heating arrangement and the shop is ready. A good varnisher is not nearly so difficult to find as an automobile painter.

We suggest that many dealers can work up a nice business and keep a lot of owners happy if they will promote the idea, "Varnish once a year will save the paint." But dealers must warn their owners that varnishing a car is not an amateur job. Buying canned varnish and putting it on at home will ruin the appearance of the best car.



For every man with a wide awake plan for reaching and serving car owners a big summer business is assured.



Associations

THE effort of the Illinois State Automotive Association to build up the community associations is a step in the right direction and is certain to do much good. This effort has been projected on definite experiments. The management of the State Association and the Peoria Association are very closely linked and the promotion work for local associations is based on Peoria experience.

Manager Zillman of the State Association has reduced to a minimum the things that a local association must do to be of benefit in a community. These are the things that are urged upon the local association. The fact that he is not moving for the maximum is worthy of comment. He urges the minimum first because that is a considerable step forward from usual practices. So many local associations are content to run along merely as luncheon dates once a month.

Zillman has the belief that to be successful there must be certain dignity and routine in association work. He is trying to inject this idea of work into these associations. He is on the right track.

We hope to see in the near future a movement to link the local associations to the state associations and then to the National Association through a bureau of the latter. Then we will begin to function as a powerful industry that can make itself felt in matters of politics and business. All elements in this needed connection of interests are willing, but there is too much laxness on the part of those who most need this work, the small town dealer and his association.

There is so much promotional work to be done for this industry that we must be prepared to fight on the offensive. A solid front is the first step toward such fighting. Otherwise, the dealers will be prepared to fight only on the defensive when cornered.



The used car has not been given a square deal. It deserves better merchandising treatment.



Sales Rooms

AST. LOUIS dealer could not find a suitable room in which to house a selling branch that he wanted, to present his cars to a certain suburb of that city. He bought a large tent, erected it on a lot near where he wanted to display his cars and fitted it up as nearly as he could like a regular salesroom. He

put in regular desks, a telephone, some ornamental furnishings and is reported to be doing quite a nice business.

The main point about this sales room is that it does not look like a temporary thing, that might be gone tomorrow. It looks like a substantial effort and the customers who call there are made acquainted with the permanent quarters only a few miles away. It is aggressive selling.



Accurate knowledge of the cost of doing business is a necessary first step toward profits.



The Transportation Store

IN some department store publicity we have recently read that in a mid-west city a man had talked quite a bit among his acquaintances about buying a foreign car that was not sold in that community, if in the country. This gossip reached the manager of the accessory department of a department store which this man frequently patronized. When he went to that store, the manager asked him about his purchase of the foreign car, learned from him exactly what he wanted and offered to get it for him.

The order was given, wired to the New York agent of the store and cabled to France. In six weeks the car was delivered.

The department store hails this as a great feat of merchandising and we are inclined to think the store is right. Without a capital investment, the store cleaned up a nice profit and pleased a customer.

This calls to mind that our own industry is building up sales agencies for certain products and doing a very good job of it but there does not seem to be the elasticity about the system that might be profitable and that would give satisfaction to the transportation customers.

There has been some effort among American makers of fine cars to establish sales agencies in communities where it would be unwise to carry a stock of cars on the floor, but the dealers have not been responsive. We believe the day is coming when some live dealer in the smaller cities will let it be known that he can supply fine cars, even if he does not have a car on hand. Such enterprise will be profitable not only to makers of fine cars but to the dealer who gets a small commission for making the sale.



It is time for everybody to realize that factories and dealers should not live OFF each other, nor ON each other, but WITH each other.



Books and Maps

SEVERAL Chicago automobile and accessory dealers are selling maps and Blue Books. Some of the accessory dealers say that they make quite a bit of profit on these books and maps, but those car dealers who sell these items say that they are doing so more for the

accommodation of their regular customers than for the profit that may be in the sales.

Whatever the results of these sales may be, we want to indorse the idea of an automobile dealer selling approved books, maps and other driving and touring aids for the good that will result to the industry. Touring is a subject of great interest and a large number of people buy automobiles with a view of using them in touring. The more of the right kind of information these people can get, the more enjoyment they will have from their tours.

We believe that if the automotive dealers will add a few instructive books to the merchandise in their Transportation Stores, it will be a benefit to the car-owning public. The fact that this would increase the enjoyment in the use of the car is a sufficient recommendation, but another reason is that we believe that dealers would sell only helpful books and book stores do not extend this censorship to the books they offer.



Flat rates and good shop equipment go hand in hand to make greater profits.



Paint and Used Cars

AUTOMOBILE painting as a craft has never come into its own. In the average county there is a number of house painters who look after the residences and barns of the community, and in many of these communities there are almost as many automobiles as there are houses. Yet in some of these counties there is not a single trained automobile painter nor one who has the inexpensive equipment that is necessary to paint cars.

As a rule, in the rural counties it seems to be the opinion that a house painter can paint automobiles. It would be just as reasonable to expect the horseshoer of a few years ago to repair the automobile engine.

Automobile painting is a special craft and must be learned as such. First off, it is necessary for the house painter to discard all that he has learned about the application of paint. Then it is necessary, if he is going to turn out a good smooth job, to provide a proper shop with proper ventilation. This is not expensive.

Strange to say the paint companies have overlooked this market and have not, if we can judge by apparent indications, attempted to build up an automobile painting craft in the smaller centers of population. Instead they have sought to make and advertise paints that they say the owner can put on his car himself. As a result, you see some weird and wonderful paint jobs. When the owner of this self painted car attempts to sell his car as a used car, he is penalized a considerable percentage because of the grotesque appearance of the car.

Automobile painting is a specialty and never will be an amateur job. When a proper appreciation of this fact is established, paint makers and car owners will profit by it and car dealers will not have so much difficulty in moving used cars. There are many dealers who employ house painters to brush up their used cars and the actual results are negative. Every community of size should have a competent automobile paint shop to stop this damage.

Inventory Period Causes Slow Down of Production

**Schedules, However, Promise to
Continue at Fairly High
Rate This Summer**

NEW YORK, July 2—Due to inventory taking many automobile plants, among them the major producers, will close down for a short period this month or next, this naturally affecting the total output for July and August. Regardless of this interruption in operation, the production rate of the industry as a whole will be maintained at a satisfactory level without, however, approaching the high marks established in preceding months. Factories of the larger makers have been running at capacity for some months and those of others have been carrying on along extraordinarily high schedules due to the strong pressure from the retail field. While the demand for cars is not so active as it has been, it is reported to be in sufficient volume to warrant plants operating on good schedules.

Dealers in some sections have sufficient open models on hand to satisfy summer trade or to meet the call during July, at least. The overhauling of plants will give manufacturers an opportunity for developing plans for future business and for production activities upon the resumption of operations.

Manufacturers are centering their attention on agricultural districts, many feeling that the peak of the demand in commercial centers is past for this year and they are watching crop developments as a barometer of the buying power and disposition of the farmer. While cars are being sold in these sections, the full possibilities will not be realized until the farmer is able to gage definitely the extent of the harvest and the prices it commands.

Commercial centers are increasing their truck purchases and schedules among builders continue to be well sustained.

GOOD SALES IN NEW ENGLAND

BOSTON, July 1—New England continues to absorb motor cars readily, according to the reports of motor dealers here. Averaging up the statements from among the entire group here is about what it sums up. There seemed to be a "seasonal" let up in New England earlier than usually happens, but it did not last. The first week in May saw a falling off in orders, then the month picked up. The same thing happened in June, and some of the dealers felt that it presaged a general let up. But it did not. Orders came in again at a plentiful rate. That is for the general run of the cars that have been well advertised.

DETROIT DEALERS OPTIMISTIC

DETROIT, June 29—Detroit dealers express a great deal of confidence over the prospects for retail business during the summer months. It is not expected

that buying will be as heavy as in the early months of the year but a good summer business is looked for, better than usual in the July-August period. As reason for this they point to the lack of unemployment in the city, and the generally prosperous condition brought about by booms in the automobile plants and the building industry.

Outside the city there is good business in the manufacturing cities and towns of the State, but not much business in the rural communities. Dealers reliant upon farm buying are not doing much business and are not looking for much before the fall months.

PEERLESS ELECTS NEW DIRECTORS

CLEVELAND, June 30—George A. Coulton, senior vice-president of the Union Trust Co., Fred R. White, capitalist, and Victor W. Sincere, general manager of the Bailey Co., and president of the National Department Stores Co., have been elected to the board of directors of the Peerless Truck and Motor Co. They are all leaders in local financial and business circles. The board of directors now consists of the newly elected and the following: R. H. Collins, president; G. H. Layng, W. H. Collins, John F. Porter, F. A. Trester, C. E. Sullivan, H. A. Tremaine, and D. A. Burke.

In view of the present financial status of the company, it was the opinion of the board that as the dividend for the year had been earned it might as well be declared. It was voted to declare dividends at the rate of \$1 a share for the last two quarters of the year, one to be paid on Sept. 30 to stock of record of Sept. 20, and the second to be paid Dec. 31, to stock of record of Dec. 20.

BOSTON DEALERS ELECT

BOSTON, July 2—The annual meeting of the Boston Automobile Dealers' Association resulted in the election of the following officers: President, John H. MacAlman; vice-president, J. W. Maguire; treasurer, J. W. Bowman; clerk, Chester I. Campbell; directors, J. W. Maguire, J. H. MacAlman, J. W. Bowman, J. H. Johnson, F. A. Hinchcliffe, C. E. Fay, C. P. Rockwell, J. O. Donovan, G. E. Kilball, A. I. Danforth and W. C. Sills.

DEATH OF HORACE DE LISSER

NEW YORK, June 30—Horace De Lissier, founder and chairman of the board of directors of the Ajax Rubber Co., and president of the Rubber Association of America, died at his home in this city after a brief illness resulting from a nervous breakdown. He was one of the pioneers of the tire industry, dating his connection from the old bicycle days.

STRANAHAN BACK FROM EUROPE

DIXVILLE NOTCH, N. H., June 30—R. A. Stranahan, president of the Champion Spark Plugs Co., Toledo, is home from an eight week European trip during which he extended and strengthened the Champion distribution in England and the Continent.

Paterson Automobile Company Is Bought by D. E. Winslow

**Purchaser, Dodge Dealer in Flint,
Plans Greater Production and
Lower Price**

DETROIT, July 2—The W. A. Paterson Automobile Co., Flint, manufacturer of the Paterson car, has been purchased by Dallas E. Winslow, Dodge dealer in that city, who will reorganize the Paterson company on a basis permitting of considerably increased production. Winslow will be president of the new company and plant supervision will be vested in E. C. Kollmorgen, in charge of Paterson engineering and production for the past nine years. The new incorporation will increase the present \$300,000 capitalization materially.

Winslow does not expect to complete his plans for the future operation of the company within 30 days. By this time it is hoped to have details in such shape that the new incorporation may be filed and officers announced.

The Paterson line will be changed to a considerable extent though maintaining the general principles of the former type. Prices will be lowered throughout, the largest reduction to be in closed models, Winslow said. The extent to which production will be increased is largely a matter of closed body supply, Winslow said. Retention of the name and product is planned, according to Winslow, because of its established character.

The Paterson company dates back to 1869 when it was formed by W. A. Paterson as a carriage building company. In 1909 the manufacture of automobiles was started.

Winslow said he planned to sell the new Paterson car through the present dealer organization of that company and would also extend this rapidly as factory production made possible. Investigations in the retail field, he said, convinced him that there was a large market for the type of car he proposed to place on sale.

Ford Trucks to Be Provided With Cab and Body Complete

DETROIT, July 2—Ford Motor Co. has outlined plans for the sale of its truck complete with cab and body, probably starting some time this summer. The cab and body will become part of the regular equipment of the truck, prices to be fixed later. It was the company's plan to begin building its own combination body on the truck last summer, but this was deferred. It is understood that the company's intention in equipping the truck with its own body is to give the buyer a body at a price in conformity with the chassis price.

NEW GATES PRICES

DENVER, July 2—The new price list of the Gates Rubber Co. quotes the 30 by 3½ cord tire at \$15.50, and the fabric at \$13.90.

Average Profit of \$50 on Used Cars by Boston Dealers

BOSTON, June 29—Boston dealers made a profit of \$50.81 per car on the 2202 used cars handled by them in the three months from March to June, according to the report just made by General Manager J. W. Bowman of the Used Car Statistical Bureau. This was a surprising showing when compared with that period previous to June, 1922, when the average profit, after reconditioning, was only \$5.35.

The figures quoted by Bowman show that on the 2202 used cars the total allowance was \$1,470,197.13. The dealers spent \$84,044.22 in reconditioning the cars, bringing their investment up to \$1,554,231.35. They sold for \$1,666,112.46, leaving an excess for overhead selling of \$111,811.11.

The average sale price per car was \$756.84, while the allowance price per car, less repairs, was \$667.66. Repairs cost \$36.17, bringing the total cost per car up to \$705.83.

Prosperity Keeps Sales High in Southern Cotton States

ATLANTA, Ga., July 2—Automotive sales in the Atlanta territory have shown little or no abatement the past month, and a majority of dealers and distributors are looking for 1923 to prove one of the best years they have ever enjoyed in this district. Registration figures at the state capitol show sales unusually good this year in the rural districts throughout Georgia, and most dealers express the opinion this business is at least 100 per cent better than at this time last year. The crop outlook is excellent, with a normal cotton yield in promise, and the price holding firm near 30 cents.

According to the Atlanta branch of the Ford Motor Co. the Ford weekly purchase plan is proving unusually successful in this section, and has brought about a material increase in Ford sales. The plant here has found it necessary to construct an addition to increase the capacity this summer.

BIBLE SCHOOLS TEACH SAFETY

CHICAGO, July 2—Two hundred daily vacation Bible Schools throughout the city opening today will undertake to teach 40,000 children enrolled in them how to avoid injury by automobiles.

The children will be schooled to cross streets only at regular crossings, to look both ways for traffic, and to play in the parks, vacant lots, back yards and on the sidewalks rather than in the streets.

FORD WEEKLY OUTPUT

DETROIT, June 30—Ford output of cars and trucks for domestic use in the week ending June 26 was 40,197. Tractor production was 1,115 and Lincoln car output 191.

Sales to Wisconsin Farmers Continue in Good Volume

High Prices for Dairy Products Result in Prosperity Throughout State

MILWAUKEE, Wis., July 2—Whatever slowing down in sales of passenger cars is now occurring is regarded by dealers as an expected seasonal development, based on the trend of business during 1922, when, as this year, the peak of demand came about the end of May, although slackening was not appreciably felt until after July 1.

Interior dealers have experienced an active farm demand all the year so far and report this well sustained. Wisconsin is a dairy state and rural families are not dependent for income upon grain crops, which are now selling at very low prices, while milk, butter and cheese are bringing fairly high prices. Therefore the purchasing power is relatively good. While sales to farmers have been in greater volume than expected earlier, selling work has been difficult owing to the pessimistic attitude of farmers when solicited to buy almost anything. This, however, is a thing peculiar to farmers as a class.

Ford dealers are oversold and usually are 15 to 30 days behind on deliveries. So far comparatively few people have taken advantage of the weekly purchase plan, prospective buyers in most instances preferring to make the regular down payment when they find it necessary to take advantage of partial payment plans.

Government Experts Study Rubber Growing Possibilities

WASHINGTON, July 3—A study of rubber producing plants in the Amazon Valley is being undertaken by the United States government to determine, if possible, whether or not rubber plants may be grown in this country, to the end that the United States may ultimately produce its own crude rubber.

Four governmental experts sailed today for South America to make a biological study of rubber plants. They are Dr. C. D. LaRue, Dr. J. R. Weir, E. L. Prizer and M. K. Jessup of the Bureau of Plant Industry, Department of Agriculture. Dr. C. F. Marbut, of the Bureau of Soils, is accompanying the party to make a study of the soils in reference to rubber production.

BRUSSELS SHOW DEC. 8 TO 19

PARIS, June 15—(By Mail)—Brussels will hold its automobile show from December 8 to 19, this being about one month earlier than the usual date. In addition to passenger cars and trucks, it has been decided to include an aviation section and a motor boat division. The show will be held in the Aviation Palace, a new building replacing the Palais du Cinquenaire, which has become too small for this purpose.

Detroit Dealers Urge Ordinance Against Jay Walking

DETROIT, June 30—Detroit Automobile Dealers' Association has petitioned the city council to pass an ordinance prohibiting jay walking. Such an ordinance has been contemplated by some members of the council for some weeks and conferences have been held regarding legal aspects. Now the initiative has been taken by the dealers' association, represented by A. L. McCormick, vice president, and George A. Kelly, attorney.

Under the ordinance considered by councilmen the jay-walking ban would be limited to the downtown section and fines would be provided for persons crossing the street at any place but the outlined crosswalks. Full responsibility for injury to pedestrians at cross walks would be placed upon motorists. Outside of the downtown districts the ordinance would apply only at corners at which traffic policemen were stationed. A campaign to show the need for the ordinance would be conducted in the newspapers and in the schools.

Summer Weather Brings More Car Sales in Iowa

DES MOINES, Ia., June 29—Late spring, which retarded to some extent the automotive business of Iowa, has given away to real summer weather and the automotive business of the state has kept pace with the mercury of the thermometer.

Des Moines business for May of this year shows a substantial increase over May of last year. During May 847 passenger cars and 48 trucks were sold as compared with 670 passenger cars and 64 trucks in the corresponding month of last year. Used cars are selling fairly well. The prices on used stock have maintained about the same level since the beginning of the year. Payment of the soldier's bonus in Iowa has stimulated business to some extent. Sioux City reports an increase in business since the weather has become better.

GOOD SALES IN NEW YORK STATE

SYRACUSE, N. Y., June 30—This spring has been one of the biggest in the history of the automobile business in Central New York. Syracuse dealers showed an increase of 61.8 per cent in new car business for last May as compared with May, 1922. The demand continues heavy and many dealers are making sales with promises of future delivery.

BAKER PROMOTED AT OVERLAND

TOLEDO, July 2—Arthur J. Baker has been appointed chief engineer of the Willys-Overland Company. He joined Overland when he took charge of its factory research department Aug. 2, 1920.

Wisconsin Governor Vetoes Two-Cent Tax on Gasoline

**Believes Additional Burden More
Than People Should Be Required
to Bear**

MILWAUKEE, Wis., June 30—The net result of six months of wrangling in the biennial session of the Wisconsin Legislature concerning changes in automotive license and taxation laws is the adoption of a new system of annual licenses based on weight, instead of the present flat fee of \$10 a year for privately owned passenger cars, and the vetoing of a 2-cent tax on gasoline by the Governor after the two houses of the legislature adopted the system by large majorities.

It has been deemed so certain that the governor would approve of both the weight tax and the gasoline tax that state machinery had been set in motion to administer the gas tax act, which would have been effective July 1. The new system of license fees will go into effect Jan. 1, as present licenses are annual, expiring Dec. 31 each year regardless of date of issue.

The weight tax is estimated to raise \$6,500,000 annually for highways, while the gas tax was counted on to produce \$3,000,000 more. The governor said the combined revenue was more than the people of Wisconsin could reasonably be expected to pay.

Cleveland Dealers Plan to Have Used Car Show Yearly

CLEVELAND, June 30—The success of the first used car show in this city led dealers to talk of making it an annual affair.

When the used car show came to an end June 24, approximately \$325,000 had been expended by local consumers for used cars during the little more than a week that the exhibits were on the floor at the Judd auditorium. Herbert Buckman, manager of the Cleveland Automobile Manufacturers' and Dealers' Association, which sponsored the show, stated that one of the big results of the show was the lifting of the used car to its proper place as an article of merchandise. The show also developed confidence in the reconditioned car, and both of these are an asset to the dealers selling new cars.

Of the cars sold during the show, \$100,000 worth were disposed of on the floor. Many were sold in the show rooms of dealers. This selling of cars away from the exhibit was made possible under the plan of the managers of the show, whereby all reconditioned cars were certified by the association as coming up to its standard. A certain number of cars were then placed on exhibit, and others bearing the tags of the association were displayed in dealers' show rooms.

Free Wash Rack Provided for Customers



This photograph shows the complete facilities provided for owners to wash their own cars by Evans & Westbrook, proprietors of a filling station and accessory store at Newton, Iowa. The use of this wash rack, with cover overhead, is free, but the proprietors have found that it more than pays for itself. A very large proportion of the car owners who make use of it decide after cleaning up the car to have new oil put in the crankcase, and of course they fill up with gasoline, and in many cases they make other purchases.

Many Fast Cars Among July Fourth Entries at Kansas City

KANSAS CITY, July 1—A late entry brings to 14 the total number of cars for the Speedway races July 4. This last one to come in is the Mercedes special, entered by Louis Chevrolet, and to be driven by L. L. Corum. Another last-minute announcement was the driver for

the Wade Special, Ralph DePalma. This car was a Durant Special, Miller motor, in the Indianapolis race. The new owner of the car is George L. Wade, an oil man of Kansas City.

Following is the list of entrants and the numbers they wear in the race:

No.	Car	Driver	Entered by
1	H. C. S. Sp.	Tommy Milton	Harry C. Stutz
2	H. C. S. Sp.	Earl Cooper	Harry C. Stutz
3	Wade Sp.	Ralph DePalma	Geo. L. Wade
4	Elliott Sp.	Frank Elliott	Frank Elliott
5	Durant Sp.	Jimmy Murphy	R. C. Durant
6	Durant Sp.	Eddie Hearne	R. C. Durant
7	Durant Sp.	Harry Hartz	R. C. Durant
8	Durant Sp.	Jerry Wonderlich	Jerry Wonderlich
9	Duray Sp.	Leon Duray	Leon Duray
18	Duesenberg Sp.	Bennett Hill	Duesenberg Motor Co.
19	Duesenberg Sp.	"Howdy" Wilcox	Duesenberg Motor Co.
21	Duesenberg Sp.	Dave Lewis	Duesenberg Motor Co.
29	Durant Sp.	Harlan Fengler	William White
	Mercedes Sp.	L. L. Corum	Louis Chevrolet

BIGGEST HAYNES WEEK

KOKOMO, Ind., June 29—"The week of June 18-23, saw more Haynes cars shipped than any other week this year," said Gilbert U. Radoye, director of sales and advertising for The Haynes Automobile Company, Kokomo.

"Not only was a record set for the year in freight shipments, but the largest drive-away of the season was made when Triangle Motors, Incorporated, Haynes distributors at Chicago, came to the factory to get their quota of Haynes cars."

FIRESTONE MEETS LOWER PRICES

NEW YORK, June 29—Firestone Tire & Rubber Co. has issued a new list effective June 25 which brings the prices on some of its tire sizes down to the Aug. 22 list. This meets the greater reductions made previously by other makers.

TO CONTINUE APPERSON 8

KOKOMO, Ind., July 2—"We are going to build the eight today, tomorrow and perhaps always," said N. H. Van Sicklen, president and general manager of the Apperson Bros. Automobile Co., in response to questions as to whether or not the eight cylinder car would be continued following the recent introduction of the six-cylinder Apperson.

RUGGLES PRICES UP

SAGINAW, Mich., June 30—Announcement is made by the Ruggles Motor Truck Co. of a new list effective July 1 advancing prices. It is as follows:

	Old Price	New Price
Model 15, ¾ ton	\$ 795	\$ 895
Model 20-R, 1¼ ton	1295	1375
Model 40, 2 ton	1995	2095
Model 40-H, 2½ ton	2195	2295

Roamer Motor Car Company Succeeds Barley Corporation

Concern Manufacturing Roamer and Barley Cars Consolidates With Kalamazoo Realty Co.

KALAMAZOO, Mich., June 30—Organization of the Roamer Motor Car Co., which consolidates the interests of the Barley Motor Car Co. and the Kalamazoo Realty Co., is announced by A. C. Barley, president of the concern.

The new company has an authorized capital of 300,000 shares of no par common, of which 200,000 shares are to be issued immediately. The company will also carry in the treasury \$1,000,000 of preferred stock, which may be issued later.

In connection with this campaign of refinancing announcement is also made that Barley has closed a contract with Diamond & Murphy, a new York distributing house, for \$19,000,000 worth of Pennant taxicabs for delivery during a five year period, 1,200 of which are for delivery during the current year.

In addition to the extensive manufacture of taxicabs, the concern is also enjoying a growing demand for Roamer and Barley motor cars. It is reported that the present monthly production is about 150 cars.

The Roamer Motor Car Co.'s new directorate is a strong one and representative of the company's more commanding position financially and industrially. It includes A. C. Barley, president; George B. Hopkins, treasurer; W. S. Perkins, vice-president of the Chatham & Phoenix National bank, New York City; W. S. Thomas, president of the Thomas-Daggett Canning company, Grand Rapids; J. W. Stephenson, president of the Indiana Truck company, Marion, Ind.; Charles A. Blaney, Wheeler-Blaney company, Kalamazoo, and Charles Bard, wholesale steel and iron, Kalamazoo.

William Elliott Phelps will continue as general sales manager of the concern.

Ground Broken for Erection of First Doble Steam Factory

OAKLAND, Cal., July 1—Ground has been broken at Park avenue and Harlan street, Emeryville, a suburb of Oakland, for the new plant to be erected by the Doble Steam Motor Car Corporation. The first unit of the plant is to be on a production basis by Nov. 1, and the completed plant will cover two and one-half acres, with a building five stories in height. The manufacturing area is to be 361,000 square feet and the office area 41,300 square feet. Total cost of the plant is to be \$900,000.

Mayor John L. Davie of Oakland turned the first spadefull of earth, and the occasion of a joint celebration by ground-breaking exercises were made the Oakland Chamber of Commerce and the Emeryville Industrial Association.

These exercises started with a luncheon in the Hotel Oakland, with Abner Doble, inventor of the Doble steam car, and president of the company, as the guest of honor. After the luncheon a parade was held in which appeared duplications of five of the early models of steam automobiles, and of present models of the Doble car. The Emeryville Association entered 100 automobiles in the parade, while the Alameda County Automobile Trade Association was represented by 50 cars, and the various Oakland industries by 100 more.

The property purchased by the Doble company, and on which work of erection of the plant has commenced, measures 270 feet on Park avenue, and 400 feet on Harlan street. It has a total area of 108,000 square feet.

A. C. A. CLUB HOUSE SOLD

NEW YORK, June 25—The sale of the clubhouse of the Automobile Club of America at 259 West Fifty-fourth street, long a landmark in motoring, is announced. The property consists of a plot 131x100 feet on West Fifty-fourth street on which an eight-story building stands, and a plot 91x100 on West Fifty-fifth street on which a thirteen-story building stands. Real estate operators, who purchased the property, have not announced their plans.

This sale does not mean the passing of the Automobile Club of America, which was organized in 1899. The location on West Fifty-fourth street had become so valuable that the club believes it can serve its 5000 members equally as well in more modest quarters, which will be secured in the near future.

HANDLES PRESIDENTIAL PARTY

ST. LOUIS, June 28—J. James MacGregor, president of the Cadillac Automobile Co. of St. Louis, was in charge of transportation for the party of President Harding when he visited St. Louis last week. MacGregor assembled 75 model 61 Cadillacs and in these the presidential party was conveyed about the city. All cars were exactly alike and the decorations were the same. Many favorable comments were heard as to the handling of this phase of the visit.

F. W. A. Vesper of the Vesper-Buick Co. was chairman of the reception committee for the President and other automobile men had a prominent part in chief executive's reception.

DEALERS TO SHOW AT FAIR

AURORA, Ill., June 30—Automotive dealers of Aurora drew space at a meeting on June 22, for the annual automobile and accessory show to be given Aug. 17 to 25 in connection with the second annual Central States Fair and Exposition. L. L. Best has been appointed business manager. The horticulture building has been set aside for the automobile show. A tent was utilized for the show last season, but was not a success. Thirty firms will be represented this year.

No Sales Problem With New Single Eight, Says Packard

Company Believes Two Years' Pro- duction Will Be Readily Absorbed by the Public

DETROIT, July 1—Reports received by Packard Motor Car Co. from distributors and dealers about public interest in the single eight model leads to the declaration by the factory that it does not anticipate any sales problem on this model within two years. The problem will be entirely one of distribution for many months, the company declared, and a considerable time will be required alone in getting out 1,500 cars as demonstrators.

Production on the new model thus far is limited and it will be some time before a regular daily output will be reached. The company is in the position, it said, in which every single six it can build is required and it has to build the single eight in addition to this heavy demand. It is impossible at this time to say how the production run will be divided between the two classes, but the single six will continue to be the big volume car of the company.

All single eights now being built are being driven away by distributors, dealers or representatives. In working out the distribution of the car the company declares it will first supply its sales organization with models and then will follow its regular distribution method.

FEWER SALES IN LOUISVILLE

LOUISVILLE, Ky., July 2—Sales of new automobiles in Jefferson County for the month of June amounted to 818 as compared with 1,177 in May. This brings the total sales of new cars for the first five months in 1923 to 4,231. Following is a comparison of sales for May and June divided into open and closed models, in four price divisions as indicated.

	OPEN		CLOSED		TOTALS	
	May	June	May	June	May	June
High (\$2500 and up)	12	12	15	6	27	18
Medium (\$1000 to \$2500)	137	118	116	71	253	189
Low (Below \$1000)	117	105	93	60	210	165
Fords	477	290	210	156	687	446
Total	743	525	434	293	1177	818

Dealers expect the July sales to equal those of June.

ANOTHER FORD PLANT

NORFOLK, Va., July 2—Official announcement is made that the Ford Motor Co. has purchased for \$135,000 44 acres of land at Newton Park, with a frontage on the Southern branch of the Elizabeth river. An assembly plant will be erected here to care for Southern business. It is expected that the plant will be completed in eight months and it is planned to start with 1000 men, reaching 3000 in three years. It also is the Ford company's intention to erect deep water terminals for the shipment of cars to South America and European countries.

4-Wheel Brakes Much in Favor at S. A. E. Meeting

Engineers Also Discuss Balloon Tires But Not All Are Agreed as to Their Value

SPRING LAKE, N. J., June 30—Four-wheel brakes are bound to be used more widely in the near future and balloon tires are likely to have a considerable vogue, according to leading automotive engineers. These two opinions were voiced quite generally at the summer meeting of the Society of Automotive Engineers held recently at Spring Lake. Headlamp glare was also discussed by the technical men and there was a general feeling that better lighting facilities will have to be provided if drastic legislation is to be avoided.

Most of the engineers seem to think that the adoption of four-wheel brakes on middle priced and high priced cars is pretty much a foregone conclusion, although some of the most enthusiastic advocates of the new system admit that considerable design work is still necessary in connection with the brake mechanism itself and in adjacent parts.

A strong undercurrent of opinion exists, moreover, leaning toward the belief that improvement of two wheel brakes and development of better transmission brakes is needed more than brakes on all four wheels. Engineers who take this view think that people riding in a car with four-wheel brakes are strongly impressed with its stopping qualities, chiefly because adequate two-wheel brakes have not been provided in the past.

While the question is far from settled, engineers undoubtedly are taking a great interest in the situation at the present time.

Opinion is divided among tire engineers as to the advisability of immediately adopting the large section or balloon tire. James E. Hale of the Firestone Tire & Rubber Co. read a paper at the Spring Lake meeting which showed his organization to be very enthusiastic about the new tire and the possibilities for its immediate adoption. Hale stated that the Firestone engineering department is ready to turn the tire over to the sales department.

Representatives of Goodyear, United States, and other tire companies, however, were somewhat less enthusiastic about this new development, although all of them think very highly of the better riding qualities obtained.

All were agreed on the fact that the balloon tire does give better riding qualities and that its use would have many advantages from the standpoint of the car owner.

The dealer is an important factor in solving the headlamp glare problem, many leading engineers believe. It was pointed out at this meeting that good headlamp design is of little value unless it is supplemented by efficient service in adjustment by the car dealer.

Dealers, manufacturers, and engineers were urged to get behind the standards that have been set up by the joint efforts of the S. A. E., the Illuminating Engineering Society, the U. S. Bureau of Standards, and the motor vehicle commissioners of several important states.

Plan to Inaugurate State Traffic Inspection Patrol

HARRISBURG, Pa., June 30—Plans for inauguration of the traffic inspection force authorized by the Williams Motor Law, just approved by Governor Pinchot, are being made by Paul D. Wright, secretary of highways. The force will be uniformed and it can not only enforce the traffic laws but can inspect cars for "other necessary things." The force is not limited in number by the act and will form a virtual state highway patrol. Traffic officers thereunder will pay attention to the overloading of trucks, speed of motor vehicles, especially of trucks, and misuse of headlamps. The patrol will, in short, safeguard the State highways.

HEARING ON CURB PUMPS

BUFFALO, N. Y., July 2—The city council has decided to hold a public hearing on the matter of the removal of all curb pumps from the city streets, under the provisions of a ruling given by the court of appeals. This ruling declared the curb pumps illegal obstructions and directed their immediate removal.

CADILLAC TAKES INVENTORY

DETROIT, June 28—Cadillac Motor Car Co. is taking inventory this week and next while maintaining operations at about half the regular schedule. The inventory was skipped last winter because of extreme demand for cars and is being taken now "on the run" because of continued heavy business.

Winnipeg Dealers Feel Pinch of Too Much Used Car Buying

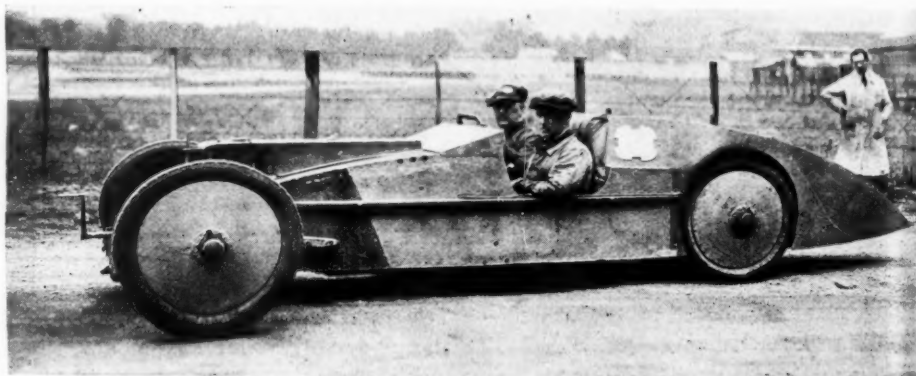
But the Dealers Are the Ones Who Did the Buying and Now the Selling Is Hard

WINNIPEG, Canada, June 30—The used car situation is by far the most perplexing problem that car dealers in Winnipeg have to face. It is estimated that at least \$150,000 is tied up in second-hand cars, with prospect of selling them dwindling as the season advances. A few of the weaker dealers, by over-speculation in used cars, already have gone into bankruptcy.

Last year the situation was not nearly as serious, owing to a co-operative effort on the part of the dealers. There was an agreement against over-bidding, and the owner of a used car soon found out that there was a uniform rate from which no reliable dealer would depart. Internal jealousy split up the organization this year, and in spite of the efforts of the leaders in the business cutthroat competition has continued apace. The dealers meet once a month to discuss their problems and though the used car question is raised at every meeting, nothing has been done as yet.

Sir Rodmond Roblin, president of the dealers' association—a former premier of Manitoba—and other leaders are convinced that co-operation is the solution. They point to the agreement between Ford dealers in the city whereby the first dealer to whom a second-hand car is offered fixes a reasonable price which all other Ford dealers rigidly observe, as proof of their contention. And as a matter of fact while the market is swamped with used cars of all other makes, there are very few Fords on dealers' hands considering that from 50 to 60 per cent of all cars operated in the prairie provinces are Fords.

Unusual Type Voisin Racing Car



PARIS, June 30—Eighteen cars are scheduled to start Monday in the French Grand Prix road race at Tours. The makes represented are Bugatti, Delage, Fiat, Roland-Pilain, Sunbeam and Voisin. All are of 122 cubic inch displacement.

The drivers entered for the various cars are as follows: Delage, Rene Thomas; Fiat, Pietro Bordino, Ernest Giaccone and Charles Salamano; Voisin, Henry Rougier, Arthur Duray, E. Gismondi and Andre Lefebvre; Roland-Pilain, Albert Guyot, Victory Hemery and Jules Goux; Bugatti, Pierre de Viscaya, and three others not named; Sunbeam, Kenelm Lee Guinness, Segrave and Albert Divo.

Winter or Summer Created at Will by Bureau of Standards to Test Automobile Engines

Purpose Is to Determine by Sustained Operation at Extremes of Temperature All the Latent Defects in Design and Construction

WASHINGTON, June 29—Taking the "if" out of motor car problems, is one of the first things that is being done by Dr. George K. Burgess, recently appointed director of the U. S. Bureau of Standards. In the two months since his appointment on April 21 of this year, succeeding Dr. S. W. Stratton, much has been done by Dr. Burgess of interest to the automobile industry.

Chief among these is a series of curious tests being made in the automotive laboratories of the Bureau where the governmental experts have automobile engines locked away in an extraordinary technical refrigerator and mounted in large altitude chambers where temperature conditions can be controlled artificially to simulate either July or January weather.

The prime purpose of the test is designed to determine all the latent blemishes and defects in the present methods of design and construction and to remedy all such shortcomings in potential types and models of motor cars.

The purpose, Dr. Burgess explains, is to operate the testing motors under constant conditions of winter or summer temperature so that they may ascertain accurately the efficiency of different grades of gasoline when harnessed to develop power under widely varying temperature conditions.

The National Automotive Engineers report, Dr. Burgess points out, that if heavier and less volatile forms of fuel could be used in our present types of automobile engines, the available stocks of gasoline would be increased approximately 27 per cent. The outstanding purpose of the investigations now in

progress, is to find out all about the differences that develop in the operation of automobile engines when various types of gasoline are used under varying conditions.

Government experts believe that the net effect of the test will result in radical changes in fuels and that this will aid in the design of new models of motor cars so built to handle heavier types of fuel satisfactorily.

The fact that winter weather conditions fluctuate so diversely in the latitude of our northern cities led to the adoption of the altitude chamber as a testing laboratory, where the value of the different fuels under constant conditions of temperature could be ascertained. An artificial ice machine, capacitated to produce 25 tons of ice daily, is so linked to the altitude chamber that it can be used to develop cold weather conditions that range to an extreme of 10 degrees below zero Fahrenheit.

If summer temperatures are to be simulated in the unique little testing shop, the ice machine is disconnected and electrical heating grids and exhaust engine gases are recruited to elevate and maintain the mercury at a point that is representative of the sultry mugginess of a typical summer day.

The recording devices are so arranged as to emphasize any particular effects of the different types of motor fuel on crank case dilution, ease of starting and pronounced acceleration. An acceleration disk is mounted on the end of the dynamometer shaft in such a way as to exert an action equivalent to the weight of the car, such as would be experienced in actual highway service.

Denby Truck Corp. Will Move Aug. 1 to New Plant

DETROIT, June 30—Denby Motor Truck Corp. will move into its new plant at Dodge and Kercheval streets, this city, by Aug. 1 and will be in production there immediately thereafter. The new plant will give the company 43,000 feet of manufacturing space, capacity for about 3,000 trucks annually, which compares about equally with the present plant. In addition the company will have an acre of ground for new building development.

Denby business is showing steady gains, said S. H. Hale, vice president and general manager, the demand running mostly for the two-ton vehicle, with a lesser buying in other models. Business is generally from industrial and commercial sources, the Pacific Coast reflecting the best sectional buying. Farmer truck buying has been light, Hale said, so far as the middle west is concerned, this

being due principally to insecurity of wheat prices.

The plant from which Denby is moving was purchased by L. A. Young Industries, Inc., and has been occupied under lease by Denby until this time. On the removal of the truck company, Young Industries will take over the plant for the general extension of its manufacturing.

CANADA BUILDS ROADS

WINNIPEG, Canada, June 30—British Columbia, which welcomes more motor tourists from the United States than any other province in Canada, paved 17,068 miles of road during the season 1921-2, according to a report of the minister of public works recently issued. Bituminous pavement was used for 10,768 miles and concrete for 6,299 miles.

The total expended on main roads was \$1,486,405. To this the Dominion government contributed \$324,655.

200 Dealers Attend N. A. D. A. Meeting at Portland, Ore.

Messages of Peckham, Vane, Gambill and Chamberlain Enthusiastically Received

PORTLAND, Ore., June 30—Two hundred dealers from all over the state of Oregon met in Portland Monday for the third of the four Pacific Coast sessions being held by the National Automobile Dealers' Association. The meetings were presided over by G. G. G. Peckham of Cleveland, president of the association; and addresses were made by C. A. Vane of St. Louis, general manager; Percy Chamberlain, member of the speakers' bureau and originator of the flat rate system; J. C. Knox, Cleveland, prominent authority on salesmanship, and C. E. Gambill of Chicago, vice-president of the national association. The messages of the various speakers were enthusiastically received and were considered as most helpful.

Local arrangements were in the hands of the Portland members of the national association, five in number, with A. B. Manley, a prominent Portland dealer, as chairman. The Automobile Dealers' Association of Portland also was active in support of the session and lent aid in handling the arrangements.

SALON DATES ANNOUNCED

NEW YORK, June 30—Announcing that the nineteenth annual Automobile Salon will be held at the Commodore, New York, Nov. 11-17, and at the Drake in Chicago Jan. 26 to Feb. 2, inclusive, the management states that already fifteen exhibitors have contracted for space. The list includes Cunningham, Daniels, Hispano-Suiza, Isotta Fraschini, Lancia, Minerva, Renault, Rolls-Royce and Voisin. Among American cars to be shown by body builders are Cadillac, La Fayette, Lincoln, Locomobile, Marmon, Packard and Peerless. Custom coachwork builders with special exhibits are Fleetwood, Holbrook, Kellner, Le Baron, Seaman and Rubay.

NEW LAFAYETTE PRICES

MILWAUKEE, Wis., July 1—Effective July 1, the Lafayette Motors Corp. announces the increases in prices as shown by the following list:

	Old Price	New Price
Chassis		\$4200
Roadster	\$3985	5000
Touring Car	4090	5000
Torpedo	4090	5000
Four-Door Coupe	5500	6300
Imperial Limousine	5750	6750
Sedan	5500	6500
Limousine	5500	6500

OLDS SALES INCREASE 43 PER CENT

DETROIT, June 29—Sales of Oldsmobiles in the first 15 days of June were 43 per cent greater than during the corresponding period of May. In the year, to date, the company has sold five times as many cars in Canada as during the corresponding period last year.

Chicago Dealers Find Sales Come Harder as Peak Passes

Good Salesmanship, However, Still Keeps the Order Book Fairly Well Filled

CHICAGO, July 2—A period of considerable uncertainty is ahead of the automotive trade in this vicinity for the next month or two. It is generally conceded that fewer cars will be sold than were sold in the earlier months of the year, but the probable extent of the deficit is a conjecture with no very definite basis upon which to calculate.

Salesmanship apparently is to be a telling factor. The aggressive sales organizations that stop up their ears when the air gets full of slump talk are signing orders at a rate almost equal to the best period of the year. One large concern with 20 years of successful history behind it reports that June was the best month in its history. Its used car inventory on June 30 was the lightest in many years.

A Michigan avenue dealer whose unit sales of a popular car run very high had only one used car on hand at the end of the month. This dealer believes that orders are going to come harder for several weeks, but he expects to get them. A dealer selling a popular car in the \$2000 class had a good month in June, but it was considerably below April which was his best month this year. This June's business also was somewhat less than that of June a year ago. Another large Michigan avenue dealer is selling at a good rate and sees no sign of a let up.

The last week has witnessed a spurt in demand for both new and used cars, apparently due to desire to possess a car for the Fourth of July holiday. A lull is certain to follow the holiday and present indications are that only first class salesmanship can overcome it. Through it all, however, the demand for the lowest priced cars seems unabated. Dealers' salesrooms are bare and purchasers must wait for delivery. The Ford weekly purchase plan has met with varied response. Dealers who have gone after orders with aggressive salesmanship have been able to procure them in satisfactory volume.

Crop conditions in this territory are favorable. The outlook for corn is good. The season is somewhat late, but fields have made rapid progress since the turn to warmer temperature.

Puts Accident Problem Up to States; Charges Laxity

NEW YORK, June 30—Holding up Massachusetts, Connecticut and Maryland as shining examples of what can be accomplished through strict supervision of motor vehicle operators, William J. Cox, engineer in charge of traffic accident research, has reported to the National Bureau of Casualty and Surety Underwriters, ascribing the failure of

most states to exercise any direct supervision over the users of automobiles, or even to make any effort to determine the fitness of persons driving such vehicles as one of the most important causes of the growing seriousness of the automobile accident problem.

As analyzed by Cox, there are 35 states requiring the licensing of professional chauffeurs only, 15 licensing all motor vehicle operators, nine requiring examination for chauffeur's license only, and seven requiring examination for all operators. In other words, he says, 33 of the 48 states make no attempt to exercise direct supervision over the great bulk of their highway users, while 41 States make no attempt to determine the fitness of these citizens to use the highways.

Service, Roads, Taxation, Are Topics for M. A. M. A. Meeting

NEW YORK, June 30—Following the announcement that the Fall convention of the Motor and Accessory Manufacturers will be held in Boston Sept. 19-21, General Manager M. L. Heminway is making rapid headway in arranging the program for the big affair.

As at Buffalo last year, there will be general sessions for all executives and other representatives of the 430 affiliated companies of the association and also the two-day conference of credit managers. The Advertising Managers' Council will have a session and in addition there will be meetings of traffic managers and export managers.

On the card for discussion are the automobile service problem, the need for more roads, better street planning and more parking space, and the necessity for combating discriminatory taxation against the automobile industry. In arranging his program, General Manager Heminway says that "wise selling strategy must look beyond the immediate present. There are three tremendous problems that constitute serious sales resistance for the automobile industry over the long pull. They are the service problem, the street and road situation and taxation. These are some of the outstanding things which will be discussed at Boston."

COLUMBIA DECREASES CAPITAL

DETROIT, July 1—Stockholders of Columbia Motors Co., at the annual meeting this week, voted to reduce the capitalization of the company from \$6,000,000 to \$3,000,000 and issue shares of no designated par value. President J. G. Bayerline said the new stock will be placed on a dividend basis at once. A. R. Dempsey, former president of Timken-Detroit Axle Co., and C. R. Talbot, vice-president of the National Bank of Commerce, were elected to the board of directors.

In the report to stockholders, Theodore Barthel, secretary, and George Martin, treasurer, said that the company had operated at a profit for the last 12 months, and during the first four months of this year there were shipped from the factory 22 per cent more cars than in any like period in nine years.

St. Louis Dealers Reduce Amount Tied Up in Used Cars

Census Shows 1445 Motor Vehicles on Hand at Average Inventory of \$516

ST. LOUIS, June 29—Favorable results of the campaign to eliminate used-car losses to dealers which has been waged for some time by the St. Louis Automobile Dealers' Association are reflected in a used-car census which has just been completed by Robert E. Lee, secretary of the association. Based on the reports of 56 concerns it develops that there were on hand in dealers' possession 1,445 used passenger cars having a total value of \$745,996, or \$516 a car. These figures are of especial significance because of the fact that it is now at the height of the trading season when it naturally would be supposed that dealers would be flooded with cars.

This number compares with 1,340 on hand in November, 1922, with a total value of \$742,444, or \$560 each, and 1,456 in November, 1921, when the total value was \$1,292,181, or \$920 a car.

There were on hand 151 used trucks with a total value of \$77,949, as compared with 184, valued at \$129,342 in November, 1922, and 244, valued at \$251,638 in November, 1921.

Dealers here report the sale of many used cars during the past week, following a special drive made for that purpose which was staged in cooperation with one of the local newspapers. It is reported that used cars of all grades were sold at profitable prices, and there appears to be every indication that dealers are becoming better educated in the matter of used-car values.

Mitchell Motors Auction Tentatively Set for Aug. 15

RACINE, Wis., July 2—Sale of the property of the bankrupt Mitchell Motors Co. at public auction has been tentatively set for Aug. 15. It is expected that the report of the appraisers will be ready by July 15, and that the trustee, Herbert F. Johnson, of Racine, will conduct the sale a month later.

No definite offers for the plant have developed thus far, but it is likely that a number of large interests will give it consideration at the proper time. It is said to be one of the best equipped factories for the production of a medium-priced passenger car.

Creditors inquiring into the cause of the failure are turning their attention to the bankruptcy of the New York Mitchell Co., a sales company, which owed the factory \$500,000 for cars shipped to it.

AIR PILOT AT 60

WASHINGTON, June 30—Maj. Gen. Mason M. Patrick, 60 years old, and chief of the Air Service, has qualified as a flying pilot of the army. General Patrick is the oldest man to qualify as an American army pilot.

Flint Production Started by Durant at Long Island

Output Is Limited Awaiting Completion of Manufacturing Plant at Flint, Mich.

NEW YORK, June 30—Durant Motors, Inc., is in production on the Flint, the \$1195 car that belongs to the Locomobile unit. Manufacture of these cars is going on at the Long Island plant, pending the completion of the big factory at Flint, Mich. As yet the Flints are being turned out in limited numbers but now that actual production has started it is expected that the daily quota will be increased from now on. The plant at Flint is rapidly nearing completion and it is hoped that it will be ready for occupancy within the next month or six weeks.

Great activity continues to mark Durant progress and on June 19 the organization celebrated the completion of its 100,000th car since Jan. 1. Of this total 73,000 have been Stars and the remaining 27,000 Durants.

The corporation is planning additional manufacturing capacity for the Durant plants at Lansing and Oakland and a new plant is in prospect for the Mason truck at Flint. This factory will be built adjoining the plants of the Flint and Star on the Dixie Highway. This decision was arrived at following the May record established by Mason when nearly double the number of trucks were produced that were produced in any previous month.

Another Durant subsidiary, the Hayes-Hunt Corp., is building bodies at the rate of 10,000 a month at Elizabeth, employing 800 men. In addition to operations at Flint it is preparing to start operations immediately at Lansing, Flint and Oakland. At Oakland Hayes-Hunt is preparing for an output of from 48,000 to 60,000 bodies annually, while larger outputs will be necessary at both Lansing and Flint, the former requiring 550 bodies daily.

Slow Down Traffic Speed Is Safety Plea in Chicago

CHICAGO, June 30—Continuing its campaign for safe driving, the Chicago Automobile Trade Association has prepared two more envelope enclosures which it requests its members to send out with all mail to their customers. Both are headed "Drive Carefully." One reads, "Help overcome the prejudice of the pedestrian toward the motorist by employing even more courtesy than you expect for yourself." The other reads, "Though the automobile is the greatest boon of modern times to mankind, it is sometimes pictured in the public print as a juggernaut. Help remove the picture."

Another feature of the safety movement is a plea for slower driving made in advertisements signed by both the Chicago Safety Council and the Yellow Cab Co., and paid for by the latter. The statement is made that the regular speed of motorists on Chicago streets is from

30 to 40 miles an hour and that many of the deaths in automobile accidents are directly or indirectly due to excessive speed. The cab company declares that it has endeavored to have its cabs operated at not more than 25 miles an hour, but that with the greater part of the traffic traveling at much greater speed it is necessary for them to go along with the traffic. It is declared that if a maximum speed of 20 miles an hour were observed accidents would be greatly reduced.

Haynes Distributor Takes on Winton in Five States

CHICAGO, June 30—Following approval of the plans to merge the Haynes, Winton and Dorris automobile companies into the Consolidated Motors Corporation, the distribution of the Haynes and Winton in this territory already has been placed in the same hands. The Triangle Motors, Inc., which for some time has handled the Haynes, has taken over the Winton and hereafter will distribute it in the identical territory which the company covers for the Haynes. This territory comprises Illinois, Wisconsin, Iowa, except a few counties; Northern Indiana and the upper peninsula of Michigan. Triangle Motors has about 100 dealers retailing the Haynes and has just started enrolling dealers for the Winton. Wherever Haynes dealers in the territory have suitable locations and proper facilities they will be given the opportunity to handle the Winton.

Triangle Motors is at 2229 South Michigan avenue, Chicago.

Allison-Rood Co., which had been distributing the Winton in Chicago and surrounding territory, maintaining a retail store at 2518 South Michigan avenue, has given up the retail end of the automobile business and hereafter will be engaged exclusively in the wholesale distribution of the Columbia. Cole Motor Co. of Illinois, Cole distributors, has been made Michigan avenue dealer for the Columbia and about 20 community dealers have been appointed in Chicago and suburbs.

SERVICE MAN DIES IN WEST

LOS ANGELES, June 30—Al Rawson, for a number of years actively associated with the formation and promotion of service associations in New York, Newark and Brooklyn, died on June 24 in California. Until about a year ago he was manager of the Reo service station in Newark and president of the Newark association, but failing health compelled him to give up his duties and his business as well.

FISHER BODY ENLARGES FORCE

JANESVILLE, Wis., July 2—An increase of 200 operatives, bringing the force to 325, will be made July 9 by the Janesville factory of the Fisher Body Corp., established several months ago to serve the Janesville branch of Chevrolet, occupying a big plant converted from the purposes of the Samson Tractor Co.

Buick, After Country Wide Survey, Foresees Good Business

Prepares to Carry on With Confidence in Continuance of Demand Into Next Year

DETROIT, June 30—Buick Motor Co. has just completed two weeks of conference with investigators who have made a study of prospective conditions in all parts of the United States. As a result of the reports received President H. H. Bassett issued a statement saying: "Our confidence has been strengthened in a continuance of bountiful business through the immediate future and well into 1924, and we shall improve accordingly."

In making the statement, President Bassett said that for some years it has been Buick's custom to dig deeply into fundamental conditions before determining production and selling policies for the ensuing year. Thus, he said, there is brought together at Flint experienced and conservative counsel whose duties it is to analyze sectional conditions critically. This group comes direct from its investigations, with all information based upon facts.

In addition to the sectional reports the company received reports on prospective conditions in the 20 leading cities of the country, and these served to amplify and strengthen the sectional reports, Bassett said. Taking the reports as a whole, he said, the company is justified in anticipating that the 1924 season will again break Buick sales records. The Buick fiscal year just closing will run far in excess of all previous years, the aggregate increase in the 20 cities over the best previous year being 128 per cent.

June sales will maintain the pace set during the rest of the year, Bassett said, and indications are that July business will be fully as large.

M. A. M. A. Sales for May Are \$58,409,550; Decrease Shown

NEW YORK, June 30—May sales of members of the Motor and Accessory Manufacturers' Association totaled \$58,409,550. While this shows a decrease of 5.25 per cent over April, which was a record month in the equipment field, yet it is on a par with March and about \$15,000,000 better than May of last year. This slight decline might be expected at this time of the year anyway, so parts people look upon it as seasonal and continue to be confident of business holding up well throughout the summer.

The status of the industry is well illustrated in the reports from the credit manager of the M. A. M. A. members, for the returns show that notes outstanding amount to only \$1,140,150, which is a decrease of 38 per cent over April and the best mark in this department that ever has been shown. Past due accounts also are in remarkably fine shape, for the \$1,982,750 outstanding represents a decrease of 14.28 per cent over April.

25,045 Sales in California in May Set a New Record

**Best Month's Business in History
Done by 16 Makes of Cars
in Coast State**

SAN FRANCISCO, June 30—California distributors of automobiles and motor trucks broke all sales records during May, 1923, according to statistics compiled by "Motor Registration News," published in Oakland, which shows that 25,046 automotive vehicles were sold in the state during the fifth month of the year. The former high mark was 23,998, set in March, this year, and the May figures are still further above those of April, when 22,215 automotive vehicles were sold. The May, 1923, figures show an increase of 56 per cent over those of May, a year ago, and more than 50 per cent above those of May, 1921. These figures indicate clearly that the general prosperity prevalent on the Pacific coast is benefiting the California automobile dealers.

According to these figures, sixteen different makes of automobiles did the biggest business in May, 1923, that they ever have done in any one month in the state, while every one of the larger counties of California did a larger business in automotive vehicles than ever before. Percentage gains by some of the counties run as high as 80, and only one among the first 20 counties is charged with a decrease in business.

Motor trucks accounted for 2,452 of the 23,898 sales, or nearly 10 per cent, and the increase in this branch of the industry for the state is 26 per cent. Truck sales in California for May, 1922, were 1,378, showing a gain of 647 sales.

Portland Dealers Hear Story of Central Used Car Markets

PORTLAND, Ore., June 29—The Appleby plan of handling used cars through cooperation of dealers and bankers, which has been put into successful use in Orange County, Calif., was explained to Portland automobile dealers at a meeting in Portland last week, at which James E. Appleby, father of the plan and a former resident of Portland, was the speaker. The meeting was held under the auspices of the Portland Dealers' Association, and was largely attended by both dealers and bankers, the latter having been especially invited.

The Appleby plan, which in brief provides for cooperation of all dealers through establishment of central used car markets run by bonded managers, and provides for cooperation of banks to the extent that the banks will withhold credit from those dealers who withdraw from the association, was declared to be working with success.

The Portland dealers, who for several months past have been operating under a central appraisal system for used cars, listened with keen interest. The Portland dealers' scheme recently passed

through a severe crisis in which it was threatened with abandonment, but proponents of the plan ruled and a number of those who had been violating the appraisal rules were fined. Now the appraisal system is working on a stronger basis than ever. Thus far, however, the Portland dealers' scheme provided no central agency for used cars, each dealer continuing to handle his used stock as before.

How 100 Chinese Students Are Studying Ford Service

DETROIT, June 29—Routine of the manner in which Ford Motor Co. is developing the 100 young Chinese students at the plant as expert service men shows that they are working in each department until they have mastered the major operations. Each student is securing eight hours a day practical experience in the factory. At four each Wednesday the whole group meets in the school building for an hour to discuss some problem of automobile construction or operation.

One of their number who is a mechanical engineer conducts a drawing class once a week for 40 members. Another leads a class in mathematics. The students have all been picked by Dr. Joseph Bailie of Pekin University. In their studies here they will familiarize themselves with process of manufacture, care and repair of the Ford car, Fordson tractor and the Lincoln. In another year many of the class will be ready for service in their native land.

CENTURY BUYS CROW-ELKHART

ELKHART, Ind., June 30—The Century Motor Co., of this city, owned by M. E. Hoshaw, Peter T. Longacher and F. E. Hughes, has bought at a trustee's sale the assets of the Crow-Elkhart Motor Corp. for \$78,700, subject to a mortgage and special assessments totaling \$16,000 on the 26-acre land tract. The total liabilities of the Crow-Elkhart company are about \$800,000 and it is said that general creditors and stockholders will get nothing, while note-holders will receive about three cents on the dollar.

The Crow-Elkhart company went into voluntary receivership about two years ago, which action was followed later by the corporation being thrown into bankruptcy. The Century company has been manufacturing the Morris London for export trade.

TRUCK DEALERS FORM CODE

ST. LOUIS, June 29—Representatives of 18 truck firms held three meetings last week to formulate a code of ethics. This body forms a bureau of the St. Louis Automobile Dealers' Assn., and Robert E. Lee is secretary.

A committee consisting of G. M. Howard of the General Motors Truck Co., Eugene Kelly of the White Co. and J. P. Reese of the Eagle Truck Co., was appointed to draft the code and submit their ideas for consideration to another meeting to be held in the near future.

Ford to Extract Motor Fuel From Coal at Canadian Plant

Believes Method of Low Temperature Distillation Will Yield 10 Gallons From Ton

DETROIT, July 1—Ford Motor Co. of Canada is preparing to make the experiment of extracting a motor fuel from coal, which if successful will result in the placing upon the Canadian market of 4000 gallons daily as a starter. There is no intimation of how far the work might be carried if the fuel and the method of its extraction prove successful, the 4000 daily quantity being fixed as the amount yielded as a by-product from the 400 tons of coal used daily in the Canadian plant.

The fuel differs from the benzol extracted at the Ford River Rouge plant as a by-product of coke, and which is now being sold at many points in this city. The new fuel, it is declared, is extracted from coal by a low temperature process, equipment for which is now being built into a special plant at the new Canadian factories of the Ford company. Following distillation the coal is reported to remain unimpaired as to heat producing quality. In making the experiment, Wallace R. Campbell, vice president and general manager of the Canadian Ford Co., said the company had no plans at this time to produce the fuel in quantities in excess of that yielded from the daily coal tonnage required at the plant. This would be placed upon the Canadian market for trial by motorists. It is expected that the new fuel will be lower in price than gasoline, though production costs are yet unknown.

Franklin, Celebrating 21st Year, Seeks Its Oldest Car

SYRACUSE, N. Y., July 1—In connection with the celebration this month of its twenty-first birthday the Franklin Automobile Co. will endeavor to find the oldest Franklin still in operation and the Franklin with the greatest mileage record.

The first car sold by the factory, in 1902, was later recovered by the company and is retained for exhibition purposes at Syracuse. The factory states that it has records of several cars which have a mileage of more than 400,000 miles.

The Franklin company began business in a small building here and the first year produced 13 cars. The company now occupies 34 acres of floor space and production is at the rate of 14,000 cars a year.

TO OPERATE TIRE PLANT

ZANESVILLE, O., June 30—The Hubbell Rubber Co., a trust estate, has been founded in this city with Charles C. Hubbell as president, to operate the former plant of the Rotary Tire & Rubber Co., erected just outside the limits of Zanesville, about four years ago.

BUSINESS NOTES

Dalton & Balch, Inc., manufacturer of D & B Silent timing gears, has started manufacture of its gears in its Toronto factory for the Canadian trade. The Chicago factory has been operating on a 24-hour schedule all this year, the company states.

Improved business conditions in Vancouver, B. C., have brought into the field several new distributing stations for automobiles, the latest being the C. C. Motor Sales Co., Ltd., which will handle the Chandler and Cleveland lines. The new company is under the management of P. and "Ted" Winram, who have been associated with the automobile business in Vancouver for many years.

J. Arthur Thompson, inventor of the Gladacres line of speed tools for Fords and other cars, has organized Gladacres, Inc., at Rushville, Ill., with a capital stock of \$20,000 and will distribute the product from that city.

precision tools under the Elkin patents, with gine for trucks and other vehicles is scheduled to start about July 1, according to statements made at a luncheon meeting of officials and stockholders at Rockford, Ill.

The Elk Manufacturing Co. of New York City, has taken over the Elk Machine Tool Corp. with increased capitalization. J. G. Elkin is president of the new company and will have charge of manufacturing and production. The company will continue to manufacture and sell Precision tools under the Elkin patents, with a plant at 243 West Seventeenth street.

George H. Rives Mfg. Co. of Brooklyn has been purchased by P. Q. Wray of Chicago, who has moved the offices and warehouse to 1464 South Michigan avenue, Chicago. The company manufactures a complete line of standard equipment and replacement pedal pads for all makes of cars.

Creditors of the bankrupt American Metal Parts Mfg. Co., 1916 St. Paul avenue, Milwaukee, met June 25 and elected Julius J. Goetz of Milwaukee receiver. The next meeting will be held July 9. The concern manufactured automobile bumpers and other equipment. The voluntary petition filed June 12 claimed assets of \$97,631 and admitted liabilities of \$48,673.

Alcohol Mixture to Make French Gasoline Cost More

PARIS, June 10—(By mail)—French gasoline costs, already exceedingly high, are certain to take an upward jump on Oct. 1 of this year, when the government scheme of mixing 10 per cent alcohol with all gasoline sold to the public will go into effect. The decree just issued states that the state alcohol, which importers are obliged to take up and mix with all automobile fuel sold to the public, will be priced at 120 francs per hectolitre when 99.4 degrees at a temperature of 15 degrees centigrade; 110 francs when at 94 degrees, and 105 francs for 90 degrees alcohol. These prices are higher than prevailing prices for gasoline, which is now being retailed at 83 to 84 francs per hectolitre, for high grade gas. It is obvious, therefore, that with this 10 per cent mixture French motorists must pay more for the doubtful privilege of using up the government's immense stocks of alcohol. The above alcohol prices are fixed for a period of one year, but are liable to change on Oct. 1, 1924.

It is possible to enforce this measure by reason of the fact that gasoline can only be imported into France by government license.

RUTHENBERG WITH YELLOW

DAYTON, O., July 2—Louis Ruthenberg, formerly connected with the man-

The Wenstone Rubber Products Co. of Chicago has announced that it will resume the operation of the former Boone Tire & Rubber Co. plant at Chippewa Falls, Wis., acquired by purchase several months ago, on July 9. The Chippewa plant will be devoted largely to the manufacture of tires and tubes, an activity which will be supervised by Thomas W. Carr, formerly superintendent of the Hannibal (Mo.) Tire & Rubber Co. J. L. Walton of Chicago will be general manager of this plant.

The Universal Motor Co., 39 Ceape Street, Oskosh, Wis., has amended its corporate articles to provide for an increase in authorized capitalization from \$100,000 to \$200,000. It manufactures 4-cylinder gas engines for cars, trucks, tractors, isolated electric lighting plants and stationary types.

Pennsylvania Rubber Co. of America has changed its official title to Pennsylvania Rubber Co. of America, Inc.

The Radio Blaze Spark Plug Co. has been organized and incorporated at West Palm Beach, Fla., with a capital stock of \$100,000, and is planning the establishment at West Palm Beach this summer of a factory for the manufacture of a recently invented spark plug. A. Guest, of that city, heads the new company.

Contract has been awarded by the AC Spark Plug Co., Flint, Mich., for the construction of a four story reinforced concrete factory building, with a floor area of 54,840 square feet to take care of increased production.

The Lee Tire Chain factory of Jefferson City, Mo., is working to create the surplus necessary to begin the actual output of chains in the near future. B. H. Linhardt, general manager of the company, has gone east to order several more machines. Tons of links for the chains have been made in the past several weeks.

Moon Bros. Manufacturing Co., builders of Moon bodies for Fords and Stars, have opened a new display room at 2650-52 Locust boulevard, St. Louis.

The Moto-Meter Co. has purchased a large plot opposite its plant in Long Island City. The plot contains an area of 45,000 sq. ft. which will be used later on for a new plant.

agement of the General Motors interests at Dayton, has been made general manager of the Yellow Sleeve-Valve Engine Works at Moline, Ill. This company is a subsidiary of the Yellow Cab Mfg. Co., and manufactures engines for the buses made by the Yellow Coach Mfg. Co. Ruthenberg resigned a few months ago as president of the Associated Motor Industries, now the National Motors Corp.

DRIVEAWAY COMPANY FORMED

CLEVELAND, O., June 30—A convoy company has been formed in this city and operated under the name of the Dealers' Convoy Co. It has been incorporated with a capital of \$2,000 to transport cars from the factory to destinations. Offices are at 13718 Coit Rd., Cleveland.

SALES PICK UP IN ST. LOUIS

ST. LOUIS, June 29—A decided improvement in the sale of automobiles here was noted during the past week. Possibly the advent of the warm weather had something to do with the desire of the public to purchase new cars, but at any rate the demand was more active than at any time during the year.

PICNIC FOR ORPHANS

COLUMBUS, O., June 30—The Columbus Automobile Club has arranged for a picnic for the orphan children of Columbus to be held some time in July, the exact date to be announced later.

Many Restrictive Measures Defeated in California

Bills Killed Largely Through Efforts of Organized Trade Would Have Hampered Motoring

SAN FRANCISCO, June 30—Through the efforts of various automobile dealers' associations, automotive trade organizations, and the California State Automobile Association, California motorists were saved approximately \$50,000,000 by the defeat of bills proposed at the recent session of the legislature imposing unreasonable restrictions and forcing motorists to equip their cars with certain patented devices.

Among the measures so buried through the efforts of the men in the industry was one requiring all motor cars to be equipped with a mechanical governor preventing operation at a speed in excess of the legal limit. This would have cost California automobile, truck and bus owners at least \$3,000,000. Another was a bill requiring inspection of brakes every 90 days by an authorized testing agency, and providing a fee of \$1.50 for each inspection. This would have cost the motorists of the state more than \$6,000,000 every year. A third defeated bill was one requiring that a bond of \$5,000 be taken out by every owner of an automobile for the payment of possible damages. This was to have been made a condition to registration, and would have cost the motor car owners of the state more than \$13,000,000 every year. Still another sought to compel every applicant for the registration of an automotive vehicle or for an operator's license to file a photograph of himself or herself, and to provide three copies of such photograph, one for the registration certificate, one for the operator's license and the other to be filed with the state. Still other bills provided for the taking of finger-prints of motorists applying for registration. Compliance with such a law would cost the motorists of California at least \$5,000,000 annually.

A measure which required that all cars driven on the highways of California be equipped with mechanical and automatic stopping and turning signals, capable of being seen and understood at a distance of 50 feet in the daytime, and requiring a certificate from the Motor Vehicle Department for each such device installed, also was defeated. It would have cost the motoring public of the state approximately \$20,000,000. Still another bill forced into the discard was one reducing the speed limit on the highways from 35 miles to 30 miles in the daytime, and 25 m.p.h. at night.

HALF MILLION IN CANADA

WASHINGTON, June 30—Canadian automobile registration has passed the half million mark, according to figures of the ministry of trade forwarded to the U. S. Department of Commerce. Total registration as of June 30, is given as 514,000.

CONCERNING MEN YOU KNOW

W. S. Scruggs, Jr., for the past three years assistant manager of the Birmingham branch of the International Harvester Co. and in charge of truck sales in Alabama, has been made assistant district manager for the South, of this concern, with headquarters in Chicago.

V. H. Day, general sales manager of the General Motors Truck Co. of Pontiac, Mich., has returned from a several weeks' survey of the Pacific coast and northwest territories.

C. C. Rosser, who for many years has been connected with the Detroit Seamless Steel Tubes Co., has been appointed district sales manager, with offices at 1206 Guardian Bldg., Cleveland, O.

W. H. Thompson, former manager of a tea company at Joliet, Ill., has been made district representative for the Russell Mfg. Co., Middletown, Conn., maker of "Rusco" brake supplies and accessories. His offices will be in Rockford, Ill.

Howard M. Harrelson is the new Kansas City manager for Clifton Mfg. Co. of Waco, Texas, manufacturer of automobile fabric equipment. He will be assisted by Earl H. McNabb.

Ralph Leavenworth, formerly advertising manager of the Standard Parts Co. is now associated with Paul Teas, advertising counselor, of Cleveland. Leavenworth is handling the account of the Bock Bearing Co. and the business paper advertising of the Eaton Axle & Spring Co., as well as cooperating on other accounts served by Paul Teas.

Richard W. Brouse, who was with the B. F. Goodrich Co. for 14 years, has been appointed sales manager of the American Tire & Rubber Co., of Akron, O.

Representatives of the automobile industry on the trial trip of the Leviathan were A. R. Erskine, president of the Studebaker Corp.; F. E. Moscovics, vice-president of the Nordyke & Marmon Co.; Ray M. Owen, president of the Owen Dyneto Co. of Syracuse; and Harry T. Hollingshead, Chicago Nash dealer.

Court Favors Dealer Whose "Buyer" Changed His Mind

SALT LAKE CITY, Utah, July 2—The Utah Supreme Court has ruled in the case of J. A. Stewart, Brigham City automobile dealer, against L. A. Hansen, in which breach of contract was charged, that a person signing a contract to purchase an automobile must accept it when ready for delivery regardless of whether any deposit has been paid or not. Hansen agreed to buy an Oldsmobile from Stewart but when the car was ready for delivery he changed his mind. Stewart started suit for \$200 in the local district court and the case was decided in his favor.

Hansen appealed to the Supreme Court. In writing the decision of the higher court, Justice Frick declared that plaintiff as an automobile agent had "performed each and every covenant on his part to be kept and performed." Stewart in his suit emphasized the fact that he kept a man on the floor of his garage to show cars to visitors and that in this case, as in all others, he had caused an actual demonstration of the machine in behalf of Hansen and at his request. The cost of appeal was assessed against Hansen.

CLUB GUARANTEES SERVICE

WINNIPEG, Can., July 3—A step toward the establishment of confidence between motorists and garagemen in Manitoba has been taken by the Manitoba Motor league by the organization of a system of official garages. Virtually every town and city in the province now

J. H. O'Brien, formerly with the Cole Motor Car Co. and other companies, has been appointed assistant to the president of Apperson Bros. Automobile Co. of Kokomo, Ind. He has been connected with the automotive industry for 20 years, his first experience having been with the Ford Motor Co. Later connections were with Regal, Lozier and Marmon.

Owen McCusker, head of the Paige Company of Northern California, with headquarters in San Francisco, has been named honorary president of the Oakland Speedway Association, Inc., which is building the new mile and one-half bowl near Hayward, a few miles from Oakland.

W. D. Legge, since 1917 master mechanic and chief tool designer for the Four Wheel Drive Auto Co., Clintonville, Wis., has resigned to accept a position with the Tuttle Press Co., Appleton, Wis.

Myron Sperry has sold his interest in the Motor Sales Co. of Menominee, Mich., to his partner, James W. Peaslee, and has accepted the position of assistant manager of the Minneapolis branch of the Willys-Overland Co.

H. D. Baker has been appointed Michigan representative to the Roller-Smith Co., of New York City, maker of electrical instruments and circuit breakers. His headquarters will be 525 Woodward avenue, Detroit.

F. W. Fenn, secretary of the Motor Truck Committee, and Harry Meixell, secretary of the Legislative Committee, of the National Automobile Chamber of Commerce, represented that body at the annual convention of the National Team and Motor Truck Owners' Association in Milwaukee, June 25-27.

E. C. Duffy, who has been directly connected with sales work in Canada for 19 of his 21 years of service with the International Harvester Co., has been transferred to South Africa as sales representative. Duffy began work in the Harvester organization in the cost department at the McCormick Works in 1902.

has one or more of these garages which by displaying the sign supplied by the Motor league holds out a promise of proper service at reasonable rates. In return members are pledged to support the concerns endorsed by the league.

A feature of the agreement is the clause providing for arbitration in case of any dispute in regard to charges. This clause provides for an arbitration board composed of the executive officers of the club who will carefully consider both sides and deliver a decision binding on both parties.

RATES TO BE REDUCED

NEW YORK, July 2—Freight rates on automobiles, chassis and trucks in carloads, boxed for export and shipped to Atlantic seaboard ports, will be materially reduced by new tariffs secured through the efforts of a special committee appointed by the National Automobile Chamber of Commerce. It was announced today by James S. Marvin, manager of the chamber's traffic department. These reductions mean much to the export business of the industry, saving as they do large sums for the buyers in other countries, who pay the freight on export.

CINCINNATI DEALERS FROLIC

CINCINNATI, July 3—The first outdoor frolic of the Cincinnati Automotive Trades Association was held June 21 at the Edgewater Club, a local amusement resort. A short business session was followed by a fine dinner. The committee on arrangements comprised: R. R. Curl, chairman; James Pennington and Hugo Mentink.

"One Thousand New Cars Each Month," Is the Boast Here

Since Start of This Year, Jefferson County, Alabama, Has Added 5000 Cars

BIRMINGHAM, Ala., July 2—"One thousand new automobiles were sold in Jefferson County, Alabama, each month thus far during 1923." This statement originates from a follower of the State statistics on cars registered in Jefferson County and a careful estimate made by him on the number of cars for which new license plates were not obtained. It is stated that the net gain in cars in Jefferson County is practically 1,000 each month. Jefferson County is Birmingham's location on the map.

Conservative estimates place the total number of new cars to be sold in Birmingham and Jefferson County the year of 1923 as slightly more than 12,000, this is based on the number sold during the first five months which exceeded 5,000 by more than a thousand and the rate of registration which is approximately a thousand cars a month. Many of the cars sold have not been delivered to date. It is thought that the cars not delivered will keep the months from June to August, inclusive, up to the thousand mark for deliveries and that the months from September to December will take care of themselves.

One agency estimates that there will be 20,000 Ford cars and trucks sold in Alabama during the year of 1923. 7,000 of these cars will be sold in Jefferson County and Birmingham, according to this estimate. Birmingham agencies are ahead of this estimate to date. The Alabama territory is divided between the Atlanta, Memphis and New Orleans branches of this concern. New Orleans handles southern Alabama, Memphis northern Alabama and Atlanta, central Alabama, including Birmingham and Montgomery.

The Drennen Motor Car Co., of Birmingham has sold over 500 Buicks, 150 Cadillacs and 72 Federal trucks during the first five months of 1923. The Brownell Motor Co., of Birmingham, Dodge agents, has led the southeast two months during the first five of this year and has never had enough cars to fill orders. This concern is purchasing second-hand Dodges to take care of the demand for this variety of used-car.

Used-car stocks of practically every automobile concern in Birmingham have been cut to a minimum during the past month. The Drennen Motor Car Co. sold 400 used cars in the first five months of the year. During the first half of June they have sold more than 125 used-cars. One week's sales of used-cars totaled more than 72.

All the automobile concerns of Birmingham have done a record business during the first five months of 1923, with possibly one exception. The general conditions prevailing in this territory have been excellent.

IN THE RETAIL FIELD

The Western Sales Co. for four years Studebaker representative, held a formal opening June 23 in its handsome new salesroom and service station, 605 Second avenue, Cedar Rapids, Ia. F. R. Whitney is proprietor.

Tyson's Garage, 2006 Main St., Peoria, Ill., has been named exclusive local agent for the Traffic truck, manufactured in St. Louis.

The Mississippi Valley Motors Co., Quincy, Ill., automobile dealer, has established a connection with the Temme Spring corporation as exclusive sales representative in that territory.

H. H. Quigley Auto Co., Rockford, Ill., has taken over the Reo agency in that city and will have salesrooms at 126 North Church St. Quigley was with the Reo people many years and has been in the automobile business 18 years. He has been in Rockford as agent for the Chicago distributors.

G. L. King, for several years connected with the Warming Motor Co., Burlington, Ia., has organized the King Motor Co., and will represent the Velie.

The Fred P. Neumeister Co., 117 North Madison St., Rockford, Ill., has become agent for the Moon car.

J. F. Overman, Jacksonville, Ill., has given up the automobile business at Beardstown, Ill., and will shortly open a garage and sales agency in the former city, having been appointed distributor for the Star and Durant cars in the Morgan county territory.

John B. Hurst, for more than twelve years with Herbert Bros., Philadelphia, the last six of which he was retail salesmanager, has formed Middle City Motors, Inc., which has its new home at 2011 Market street. It sells Chandler and Cleveland cars.

"Barney" Stevens has been appointed wholesale manager for Louis C. Block, distributor of Gray cars in the Philadelphia territory.

The dealer organization of the Pierpoint Motor Co., Philadelphia, was taken by surprise, by a dinner given to the members by J. R. Pierpoint, in connection with the opening of the company's new building at 217 North Broad street, by the appearance of A. P. Kemp, president of the Auburn Automobile Co., Auburn, Ind.

Packard automobile distribution in Minnesota has been divided three ways. Joy Bros. Motor Car Co., St. Paul, which has had this distribution 21 years, takes the southern third of the state. J. S. Sneve Co., Duluth, takes the Iron Ranges and the northwesterly section, and Walter Y. Anthony, headquarters Minneapolis, the middle section. Sneve has been manager at Duluth for Joy Bros. nine years. Louis C. Gill, formerly of Chicago, has been in charge about a year in Minneapolis. Anthony formerly was branch manager for the Packard Motor Co., in Philadelphia.

A new \$25,000 garage building is to be built this year at Palm Beach, Fla., by M. J. Jennings, according to a recent announcement. Contract for the structure has already been awarded.

The Etheredge Motor Co., of Charlotte, N. C., will construct this summer a modern automobile sales and service building at Fourth and Graham streets, according to an announcement by C. L. Etheredge, head of the company. The plant will cost about \$75,000.

One of the largest garages and service stations in the Southeast is to be built this year at Miami, Fla., by the D. L. Shackleford Motor Co., at Thirtieth St. and Second Ave., the building with equipment to cost more than \$200,000. The plant, when finished, will provide about 55,000 square feet of floor space.

The Miami Auto Sales Co., of Norwood, O., has been chartered with an authorized capital of \$100,000 to sell, repair and deal in automobiles, accessories and parts and oil and gas.

The Atlanta branch of the Chevrolet Co. announces the formation at Rock Hill, S. C., of the Huey Chevrolet Co., to act as distributor in that section of the Carolinas. The new company is capitalized at \$20,000. D. B. McFadden is president, and H. McFadden is secretary.

The Unger-Buick Co., of Miami, Fla., according to an announcement by A. A. Unger, president, has acquired a site at Twelfth St. and Second Ave., in Miami, and will construct this summer a modern automobile sales and service building, costing approximately \$100,000.

About 50 Exide service station owners and managers of the Atlanta territory attended the annual sales conference of the company held in Atlanta in mid June. Charles W. Bell, manager of the district, presiding. Volume of business the past six months in the district was the best it has ever been over an equal period of time, was the sense of the meeting.

The St. Mary's Boulevard Garage on St. Mary's Boulevard, Jefferson City, Mo., owned by J. W. Bax was destroyed by fire together with two automobiles. The building and contents were insured.

The Florida Motor Sales Co. was organized and incorporated in June at Sarasota, Fla., with a capital stock of \$100,000, and is establishing in that city a new automotive agency. Asa Cassidy is named president of the new company; C. O. Teate is vice-president, and S. E. Olson, secretary and treasurer.

The H. N. Ramsey Motor Co. was organized and incorporated in June at Springfield, Ga., with a capital stock of \$10,000, and has established in that place an automobile distributing agency.

The Petry Auto Electric Shop, owned by E. J. Petry, at Jefferson City, Mo., has opened for business in a new building at 326 Capital avenue and will specialize in electrical work, and general repairing and storage battery work.

Harry Butcher has taken out a permit to erect a brick and concrete garage building at Independence, Mo., on Osage street, between Van Horn and White Oak, which he estimates will cost \$10,000.

Lee Hainline and Cleve Henderson have secured a lease on a building site at Cameron, Mo., for three years and soon will begin the erection of a building for use as a Studebaker car salesroom and used car storage room.

The J. H. Hale Co., Hartford, Conn., which recently moved to new quarters at 449 Wethersfield avenue, handles the Stromberg carburetor. It was stated recently in Motor AGE, through an error, that another make was handled.

Allen and Wilcoxon, Fort Worth, Tex., Chevrolet dealers, was host to its employees at a big picnic recently. More than one hundred employees with their families enjoyed a day's outing and plenty of entertainment on the lake.

New Nash dealers in Missouri are: Walker & Sons Hardware Co., Intesville; Thomas Ball & Co., Ewing; T. F. Ford Motor Co., Caruthersville; Bell-Beach Garage, Fayette; Breckenridge Motor Co., Breckenridge; P. E. Garey, Mound City; Foster-Young Motor Co., Oregon, and D. D. Pickett & Son, Stewartsville.

W. H. McBurney and I. R. Gaertner, East St. Louis, Ill., have formed a partnership and opened a garage and sales agency at 1018 State street. They were formerly of St. Louis. They have been appointed distributor for the Moon car in that territory and will also operate a service station.

Virgil Green, who for the past eight years has been in Chillicothe, Mo., agent for the Buick, has sold the agency and the garage to Moore Brothers of Brookfield, who have taken charge.

Ralph and Dick Lynch, proprietors of the Lynch & Co. garage at Bethany, Mo., have taken the agency for the Dodge motor cars.

Among new Auburn dealers are the following: Smith & Reynolds, 129 E. Spring St., Titusville, Pa.; Reliable Garage, Toms River, N. J.; F. A. Whitehead, West Brownsville, Pa., and Drew Auburn Sales Co., Beloit, Wis.

Arthur Heisinger of the Heisinger Motor Company, Jefferson City, Mo., has purchased 20 acres of land on St. Mary's Boulevard, southwest of the city, and will erect a handsome home on the property at once.

The following have been appointed as distributors of the Cleveland Six car: Rivers Motor Co., Battle Creek, Mich.; Packard Motors Co. of Alabama, Birmingham, Ala.; Louis Riechmann, E. St. Louis, Mo.; Rointges Motor Co., Granite City, Ill.; Chandler-Cleveland Meriden Co., Meriden, Conn.; F. J. Kitsmiller, Cadillac, Mich.; W. H. Mills, Greenville, Mich.; Beam & Patterson, Chambersburg, Pa.; William P. Smith, Coaldale, Pa., and Simeon M. Bright, Keyser, W. Va.

The Clemens Automobile Co. entertained the employees of its Des Moines, Fort Dodge and Waterloo branches at a picnic June 11, in celebration of the biggest single month's business in the history of the company. During the month of May, the Clemens company exceeded the best previous month's business by more than 31 per cent.

Harry Adamson, former proprietor of the Franklin Motor Co. of Des Moines and formerly state distributor for the Autocar truck, has joined the sales force of the Payne Motor Co., Des Moines, Ia.

Among new Nash dealers in New Jersey are the following: Konowitch Bros., Cape May; Broad Street Garage, Eatontown; James D. Avery Garage, Matawan, and Van Notes Garage, Bayhead.

White & Milavetz, Ashland, Wis., Dodge dealers, moved July 1 from Ninth avenue and Third street to their new garage and service building on Second avenue, opposite the courthouse.

The MacCarthy-Pardue Motor Co., Chevrolet dealer at St. Louis, has occupied its new building at 6318-22 Delmar boulevard.

Among new Cleveland dealers are the following: Goess Motor Co., Philadelphia, Pa.; Middle City Motor Co., Philadelphia, Pa.; H. A. Mark Motor Co., Philipsburg, Pa.; Noll & Brunett, Renovo, Pa.; Bobo & Son, Somerset, Pa.; Peter Temperino, Vineland, N. J.; Cleveland Motor Sales Co., Altoona, Pa.; Fite & Longshire, Ashland, Ky.; John J. Ruge & Sons, Doylestown, Pa.; H. S. Golden, Hanover, Pa., and W. L. Carpenter, McEwensville, Pa.

Formal opening of the Wilson Motor Car Co.'s new building at 2921-27 Locust St., St. Louis, was held all last week. The company distributes Haynes and Dort cars.

Among recent additions to Moon representation are the following: Don P. Smith, Inc., Los Angeles, Cal.; W. R. Drexel Co., Houston, Texas; Wright Motor Co., Norfolk, Va.; M. D. Smith Motor Co., Springfield, O.; Blum Motor Co., Kansas City, Mo.; J. W. Gumm, Burlington, Ia., and the Kirkman & Cobb, Inc., Greensboro, N. C.

The Kuhn Motor Co., New Philadelphia, O., has been chartered with an authorized capital of \$25,000 to buy, sell, exchange and deal in motor cars, accessories, parts and supplies.

The Mitchell-Gruner Co. has been incorporated at Akron, O., with a capital of \$5,000 to buy, sell and repair as well as store automobiles by W. C. Mitchell and others.

The following have been appointed to handle the Nash in New York: Whitney Garage Co., Inc., Gouverneur; Oak Garage, Lindenhurst, L. I.; Clarence Empie, Schoharie County, Sharon Springs; R. J. McCarthy, Avon; Fabricant Garage, Brooklyn; King's Highway Nash Co., Brooklyn; John Schoeck, Woodhaven; Fulton Nash Co., Fulton; Farnum & Miller, Charlotte and East Rochester Garage, Inc., East Rochester.

Among new Willys-Overland dealers in Iowa are the following: Smith & Hanson, Bondurant; Churdan Mercantile Co., Churdan; Wayne County Overland Co., Corydon; Guernsey Auto Co., Guernsey; W. J. Douglas, Numa; Bemmer Auto Co., Ladora; M. W. Grua, Radcliffe; Hatton Motor Co., Bancroft; Nordschow Motor Co., Belmond; Negle Auto Co., Clarion; Smith & Paine Auto Co., Eagle Grove; K. J. Hanson, Garner; A. E. Oberlin, Laurens; Hoganson Bros., Livermore, and Harry D. Arnold, Manson.

Schmidt Bros. Co., Ford Service, 2611 Monroe Street, Madison, Wis., have started work on a new \$25,000 sales and service building, 60x125 ft., part two stories and basement.

The Packard Motors Co. of Alabama, headquarters in Birmingham, has been appointed state distributor of the Cleveland Six. This car was formerly handled by the McCarty-Greene Motor Co. of Birmingham, distributor for the Chandler.

Schneidewind & Zehma, automotive dealers, Sheboygan, Wis., have added a new motorbus department which will handle the local franchise of the Garford Motor Truck Co., Lima, O.

C. D. McCommons, Delavan, Wis., has been appointed Studebaker dealer and has just opened a new \$20,000 sales and service building. He will have charge of sales and Edward Burns is service manager.

Saunders System of Milwaukee is a new Wisconsin corporation with \$25,000 capital stock organized by Terrence E. Duffy, Emil C. Wagner and M. A. Duffy to do a general rental business in Ford cars.

The Riemer Chevrolet Sales Co., Beloit, Wis., has been incorporated with a capital stock of \$20,000 to take over the Chevrolet franchise in Beloit and southern Rock county. The principals are C. A., H. A. and E. H. Riemer.

The Reedsburg Garage, Reedsburg, Wis., owned and managed by Theodore Schlueter, has been purchased by George Koberstein and Fred Maske, who took possession June 25. Schlueter expects to continue in the tractor, automobile and farm machinery business in other quarters.

Among new Nash dealers are the following: Fowles & Wayden, Leonardtown, Md.; Kensington Motor Co., Kensington, Md.; Clarence F. Barker, Attleboro, Mass.; Nash Sales Co., Jackson, Mich.; R. R. Stevens Garage, Bald Eagle, Minn.; Nash Sales & Service Co., Brookhaven, Miss., and Hall & Hastings, Newport, N. H.

The following Willys-Overland dealers have been appointed in Iowa: D. L. Hoeffle, Newall; Miller Auto Co., Pocahontas; Renwick Auto Co., Renwick; E. D. G. Wieland, Rolfe; Roy L. Cobb, Spencer; Ferris Auto Co., Burr Oak; A. T. Holton, Decorah; Luzerne Auto Co., Luzerne; N. J. Schinker, Norway; Ross Harvey, Dedham; Joe Dolash, Tama, and Harold H. Ott, Traer.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

Electrical System Behaves When Owner Comes In

Q—What causes a Hoyt ammeter on a Dodge car to show charge either when unit is acting as a starter or generator?

When this car came into the shop the battery was dead and the ammeter was showing 10 amperes charge. On removing the battery the ammeter remained the same. After installing new battery and removing ground in ignition, the starter cranked the engine all right but the meter went clear off the scale on the charge side in doing it. With unit acting as a generator no movement of meter was noted and the needle remained at 10 amperes charge whether the engine ran slow or fast. Another ammeter cut into the circuit at one of the battery terminals showed charge as high as 10 amperes when the engine was speeded up.

The car then sat in the garage about 10 minutes, when the owner came in, started the engine and found everything all right. The ammeter showed zero when the engine was not running, and went to discharge when the starter operated. It also showed 10 amperes charge with engine running and dropped off to zero as the engine slowed down. How do you explain this?—H. R. Ross, Oakland, Calif.

Your experience is the reverse of what usually happens when the owner comes. It is customary for a car to test out perfectly and then to start mishaving as soon as the owner shows up. We have a few suggestions but do not pretend to have a complete explanation. The fact that the ammeter hand stayed at 10 amperes when the battery was removed shows either that the hand was stuck or that it was an instrument having a soft iron vane which had temporarily taken a certain amount of magnetism from a heavy current sent through the meter.

With some ammeters a heavy current through them such as would be caused by a ground in the ignition will either throw the needle off zero or, in some cases, would reverse the magnetism of a permanent magnet so that they read the wrong way. We think that the explanation lies somewhere in the action of the ignition ground you mentioned pulling heavy short circuit current through the meter combined with the tendency of such action to reverse the polarity of the permanent magnet.

We have often seen a case where a ground had reversed an ammeter in this way and the man working on the car would go to the trouble of reversing all of the wires on the meter. After doing this the accidental ground would again make contact, reverse the meter and the wires would all have to be changed back again.

While this is not an exact explanation we believe that a sticking needle com-

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

All questions are answered direct by letter, so the name and address should be given in full. This saves waiting for the answer to be published, which sometimes occurs several weeks late, depending upon the space available.

Readers' names will not be published with articles, if a request to this effect is received with the letter.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Also state whether a permanent file of *MOTOR AGE* is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by C. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by *MOTOR AGE* organization in conference.

combined with magnetism reversed by the heavy short circuit current would account for the symptoms noted, although there is nothing to account for the car behaving perfectly just as the owner made his appearance.

WATCH YOUR STEPS ON REPLACEMENT PARTS

Q—In the 1922 Buick the piston pins are a little to one side in the piston. The pin is a little closer to the camshaft. Now if we get pistons with the pins in the center will it in any way change the timing of the engine?—Clyde Powell, Sanger, Cal.

The question of the timing is a theoretical one only for the effect is very slight. However, the engine having been designed for this location of piston pin we would highly recommend that you get the proper pistons. The design is intended to overcome the tendency for the pistons to slap back and forth in the cylinders and it is accordingly desirable to use the pistons which have been found most satisfactory in this engine.

Lead Plating on Iron and Brass

Q—Give detailed information concerning the plating of lead upon iron and brass. We understand that the process used is similar to the process of silver plating, but we are not certain.—J. L. Horney, Clinton, Ind.

We quote as follows from a book entitled "The Modern Electroplater" by Kenneth M. Coggeshall:

An excellent solution for depositing lead is prepared in the following manner. Water, 1 gallon, Hydrofluoric acid, 32 ounces, Boric acid 12 ounces, white lead (lead carbonate) 16 ounces.

The hydrofluoric acid is placed in a wood container. The boric acid is then added slowly. This operation should be performed in the open or under a ventilating hood since the fumes should not be inhaled. As soon as the boric acid is dissolved, white lead may be added, followed by the required quantity of water. The addition of very small quantities of glue tends to improve the character of the deposit.

Only anodes of pure lead should be used for deposition. They can be used in the form of castings, but lead plates or sheets are more often employed.

Agitation of the solution allows a greater current density to be used. The most simple method of agitation is the release of compressed air from a tube in the bottom of the tank. Experience indicates such agitation is of little help in lead plating, yet any form of mechanical agitation somewhat improves the texture of the deposit. Heating the solution produces the same results. With agitation of the solution the voltage required is 6.

For general information on electroplating would refer you to any good book on the subject. The voltage required is 6 but the current is greater than you can get from an ordinary 6 volt generator. The constant potential charging outfits now being put on the market are very similar in design to electroplating generators and in an emergency might be used for this purpose. The positive terminal of the generator would be connected to the anode or lead plate from which the plating material is taken, while the negative terminal would have to be connected to the pieces to be plated.

When the shop conference met Bill Fixit gave the bunch a tough wiring problem and then showed them how to solve it. This story, on page 17, describes some useful testing methods.

Architectural Service

IN giving architectural advice **MOTOR AGE** aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among

other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

How much of an accessory department is anticipated.

Plan for Garage With Apartments Above

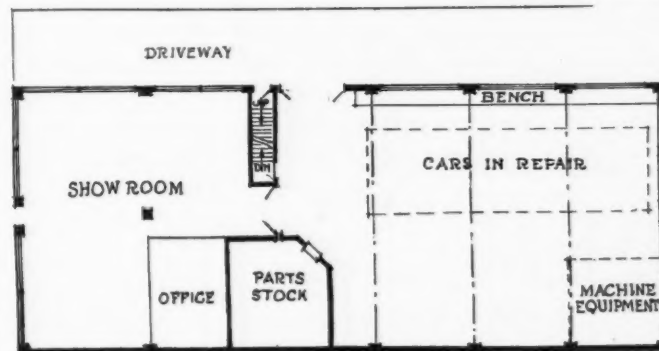
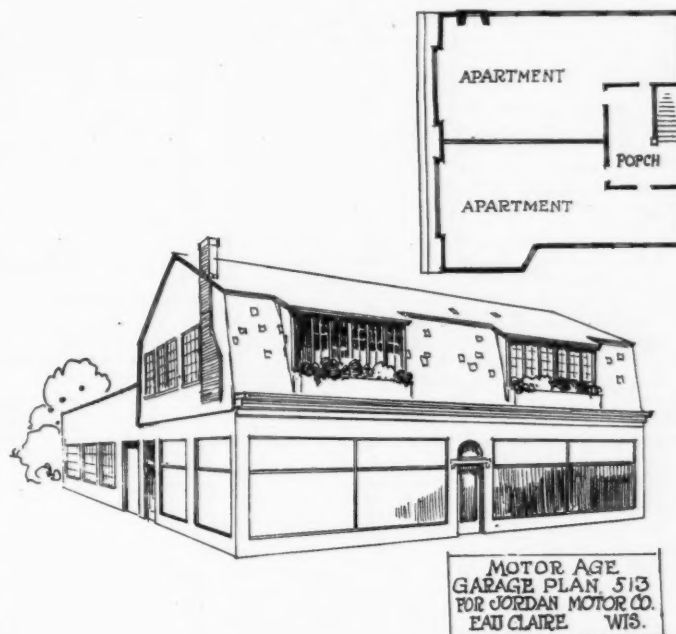
Q—We are planning on building a small garage on our lot, which is 52 ft. 9 in. by 120 ft. long. This has a good cement alley in the rear and we want the drive on the side, 12 ft. wide, as there is a home on the next lot. In this way we would have a building about 40 ft. 9 in. by 100 ft. long. We would like to build a two-apartment flat over the salesroom only, which we would like about 40 ft. deep or very near square. We do not want a large shop or storage place as we plan to service only our own cars and, of course, the ones we sell.

The thing we are interested in is the salesroom and the rooms overhead. Can you give us a very nice looking plan for a front, also the interior?—Jordan Motor Co., Eau Claire, Wis.

A—We are enclosing blueprint of plan with perspective view and second floor apartment suggestion. In as much as your building will be in a residential section, something along the line of that shown in our plan would probably meet with the favor of your neighbors and make a better feeling than if you build a regular commercial looking building.

We have placed the stairway leading to the apartments on the side, because it is practically impossible to get to the second floor from the front of the building and land at the right place without either sacrificing valuable space on the lower floor or upon the upper. We would advise you to study the thing out yourself and see if we are not right. The rear of the building which is used for shop and storage would be of much better proportion if you could build this the full width of the lot. Instead of having the driveway extend clear through, stop it at the garage entrance and extend the building at this point to the full width. That will give you room for a repair shop on one side and plenty of space at the other

for storage. As it is now, the space will be too cramped to handle any but the cars in the repair shop. Should you do as we suggest a center entrance leading to the alley would allow you a passage way clear through the building.



QUESTION ON VALUE OF FIBRE TIMING GEARS

Q—What kind of timing gears would be best in an Essex car, fiber or the regular?

1—We do not believe that plain fiber gears have ever been found satisfactory for the front end of an engine. Fiber usually swells or shrinks in the presence of oil, moisture and heat and it is hard to tell just what it is going to do. Possibly you refer to some of the composition gears made with canvas and Bakelite, which we understand give satisfactory results but you cannot go wrong by using equipment recommended by the manufacturer.

2—Can the older Essex car be equipped with timing chains to replace the gears?

2—No, this is impracticable.

3—Is there any concern making a valve cover for the Superior model Chevrolet, and if so give name and address?

3—Name of concern making valve covers will be given by letter.

4—Give timing of valves on 490 Chevrolet.

4—You can be sure of the Chevrolet valve timing if the exhaust valve closes when the piston has come up to top

dead center or has barely started down, being not more than 1/64 or 1/32 inch down from its upper position. If you get the engine timed in this way the other valves will also be correct.

5—What is the valve timing on an Essex?—Roy Gilliam, Hereford, Tex.

5—Exhaust closes 8 degs. after top dead center and opens 55 degs. before bottom dead center. Intake opens 7 degs. after top dead center and closes 42 degs. after bottom dead center.

PROPER CARE OF PAINT BRUSHES

A brush should never be allowed to stand on its end even over night. It should be suspended in a suitable brush-keeper with its point at least a half inch from the bottom. The liquid used in the brush-keeper should be suited to that in which the brush has been used, and should be kept as clean as possible. If it is intended to lay away a brush for any considerable period of time, it should not be stored in a brush-keeper, but should be thoroughly cleaned and laid away.

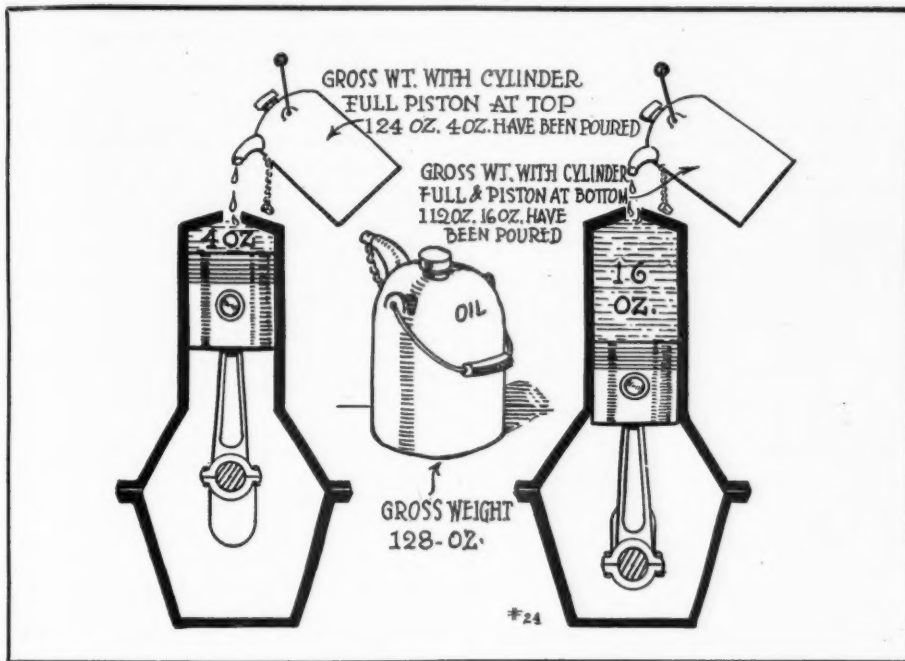
PREPARING MAGNETS FOR SHIPMENT

Q—After recharging magneto magnets how should they be placed to retain their magnetism when shipping?—Wilbur Bartram, Torrington, Conn.

When removed from the magnetizer the magnets should have a keeper placed at the poles and this keeper should be a piece of soft iron having a section approximately the same as the magnets. A piece of soft iron about 3/8-inch by 1 1/4-inch will do very well. Magnetos usually have two magnets and when both have been charged they should be placed with their unlike poles together, either side by side or end to end. If placed side by side they can more easily be tied or taped together so that they will not jar apart in shipment. The keepers may then be removed.

In shipping magnets this way it would also be well to write to the customer telling him to unwrap them carefully and place an iron keeper on each one before taking them apart. The keeper should be kept in place until the magnets are placed on the magneto again, at which time the keeper may be removed.

Accurate Determination of Engine Compression Ratio



Q—Explain how compression ratios are figured on automobile engines.—Zepp Motor Co., Chicago, Ill.

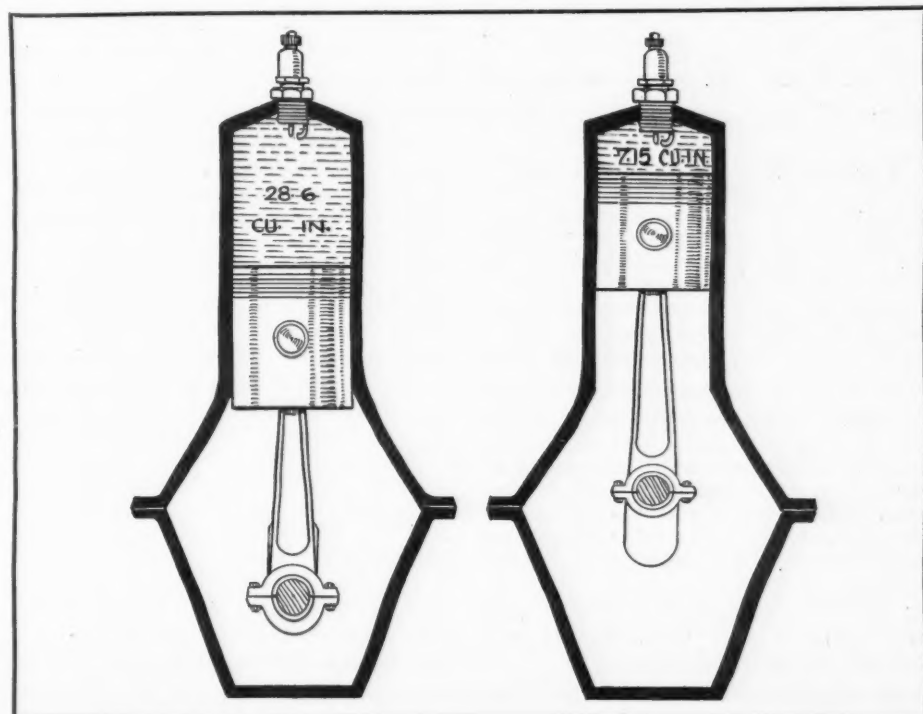
Compression ratio is the volume or cubic inches of space inside the cylinder when the piston is down divided by the space inside the cylinder when the piston is at its uppermost position. When an engine is being designed the ratio is figured by knowing the cubical contents of the cylinder at both positions of the piston. The ratio of the top center position volume to the lower center position volume will be the compression ratio. It is not always possible to accurately calculate the cubical contents of a cylinder especially where the combustion chamber is of irregular shape.

The very irregular shape of the average combustion chamber makes it next to impossible to get an accurate measurement, but the exact ratio can be determined by the following method: First, turn down the inlet tappet of the cylinder on which you wish to figure the compression ratio as low as it will go or, better still, entirely remove the tappet screw from the cam follower. Next remove the spark plug if it is in the top portion of the cylinder directly over the piston, or if not remove the priming cock or whatever removable plug or cock there is in the cylinder which is at its highest point.

Now turn the engine slowly by hand until the piston is exactly on top center of the compression stroke. Use a 2-quart measure and fill it with heavy cylinder oil and then weigh the complete measure with oil in it. Now pour the oil into the cylinder until it completely fills the combustion chamber, when the cylinder is full to the top weigh the can and oil again and record on a sheet of paper just how many ounces the can weighs after the oil has been taken from it.

Next, back the engine up, that is, in the direction opposite its rotation to the bot-

tom dead center position. At this position both the inlet and exhaust valve must be closed. Now pour in oil until the cylinder is completely filled to the top, as you did in the first place. Then again weigh the oil and can and record the weight. The procedure is illustrated in the cut where there is a can with oil in it the gross weight of which is 128 ounces. With the piston at top dead center the engine required four ounces of oil and with the piston at lower dead center 16 ounces. It will be noted that the can is marked with its weight after each filling. The ratio of the amount of oil used with the piston at top center to the amount of oil used at bottom center is the compression ratio.



If you have now determined the compression ratio the next thing is to remove the oil from the cylinder. The easiest way to do this is to remove the exhaust manifold and holding open the exhaust valve, turn the engine in the direction of rotation, so as to bring the piston smartly up to top dead center. This will displace most of the oil through the exhaust port, but there will still be left a little in the cylinder. To remove the remaining oil put the tappet back into the cam follower, but leave the exhaust manifold off, and operate the engine on the four or five cylinders, keeping the spark plug wire off of the cylinder which has the oil in it. This works all of the oil out of the cylinder through the exhaust valve. When the cylinder is cleaned of oil you can replace the manifold.

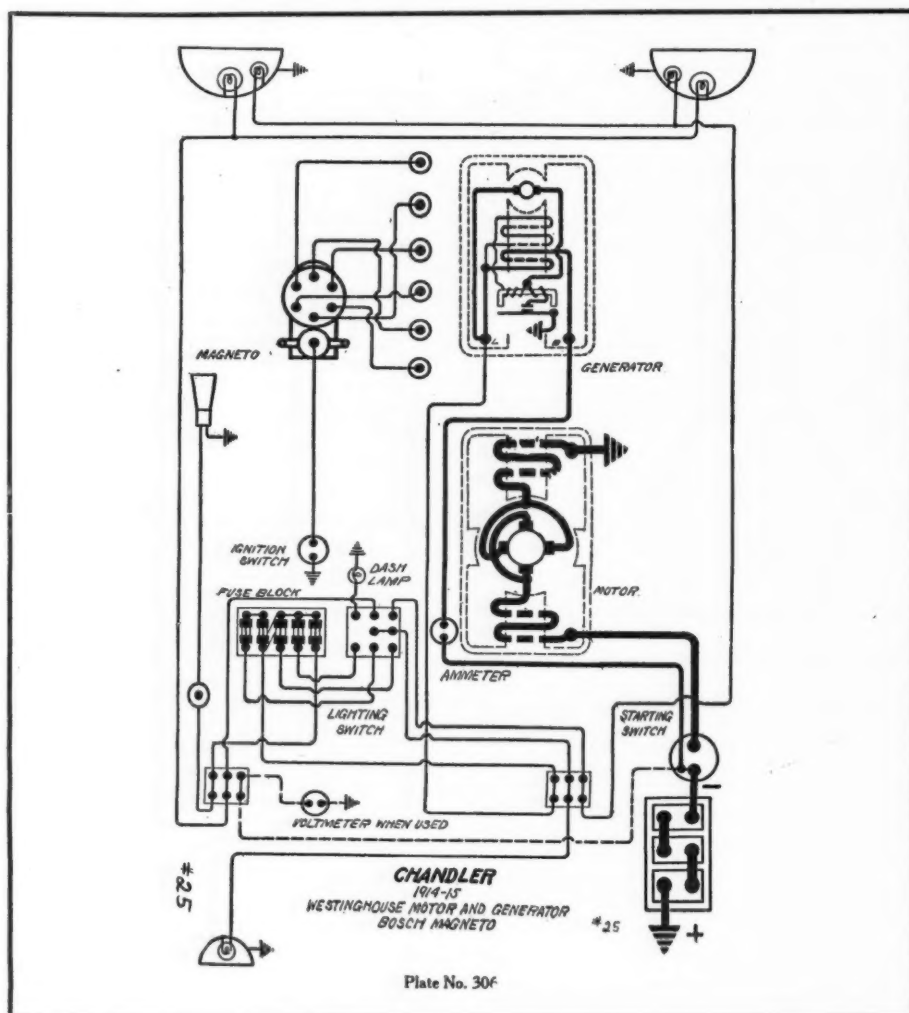
A CASE OF TROUBLE WHERE THERE IS NONE

Q—Advise the trouble with a generator on a model 34 Oakland. When the ignition switch is turned on it shows 20 amperes discharge until the engine starts. Then the generator works and charges as usual.

We think the trouble is in the shunt field winding as there does not seem to be any way to keep the current from flowing at its full capacity. The brushes seem to be all O. K., and the wiring is good and the connections are tight.—O. J. Cagle, Loveland Auto Company, Loveland, Colo.

The condition you observe is normal on this car. No cutout relay is used and the ignition switch serves to connect the battery to the ignition coil and also to the generator. Before the engine starts the generator accordingly draws about 15 amperes and the ignition 5, which produces a discharge reading of about 20 amperes on the meter. As soon, however, as the generator begins to turn it starts to generate and when the engine picks up speed the current comes over to the charge side of the ammeter as you describe.

Wiring of 1915 Chandler



Q—We have been readers of *MOTOR AGE* ever since we started in the motor car business eight years ago, and find a lot of stuff that is very valuable both to the dealer and mechanic. I want at this time, the wiring chart of a model 15 Chandler Six. If you have copies at hand, would prefer the copy at once, but if not would be glad to have you publish same in next issue.—W. A. Martin, Liberal, Mo.

A cut of the wiring system of the 1915

model Chandler is shown herewith. This cut covers model 15 cars which bear serial numbers 1 to 4,000. The model 15-B is similar to the model 15 except that the starting and lighting system was manufactured by the Gray & Davis instead of Westinghouse, which was used on the model 15.

CASTOR OIL ADVANTAGES AND SHORTCOMINGS

Q—We would appreciate any information you can give regarding castor oil as a lubricant in motor cars. Is it superior to the ordinary petroleum oils, if so, for what reasons?

Straight castor oil and blended castor oil are the favorite lubricants for racing in high efficiency engines which are operated at high speed continuously. They are considered superior because of the fact that the vegetable oils will withstand a greater amount of heat with less drop in viscosity and lubricating value than will a mineral oil. Castor has the disadvantage, however, of gumming up or thickening if let stand for any length of time. It is for this reason that when castor oil is used in the racing engine the engine is very thoroughly cleaned out afterwards.

Its greatest field of application is on engines that are subjected to great heat and high speed where the oil is kept in

an agitated condition and does not have an opportunity to congeal as it would in a stock car engine which is operated at varying speeds.

2—What kind of castor oil is used?

2—Any good grade of clear castor oil, whether it be U. S. P. or commercial castor oil, is suitable for lubrication where a vegetable oil is wanted. There are, however, several patented blends of castor oil which contain a high percentage of castor with which is blended a small amount of high-grade mineral oil. The process of mixing the mineral and vegetable oils is the patented feature of the product. The feature of these patented oils is reduction of the tendency toward congealing and gumming, but as before stated the regular castor can be used with success if the engine crankcase is removed and thoroughly flushed out after usage.

3—Does it have to be treated in any way?—Carey Motor Company, Kaylor, S. D.

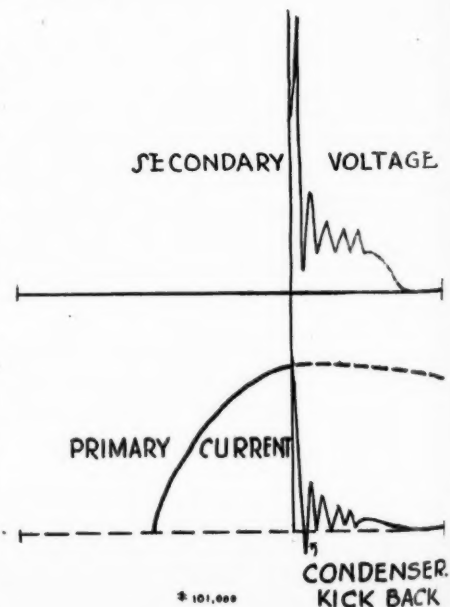
3—Except to reduce congealing it is not necessary to treat the oil, although we might say in addition that the patented oils are used more extensively than the straight castor.

DOES THE CONDENSER DISCHARGE MAKE THE SPARK STRONGER?

Q—Is it a fact that the kick-back from the condenser through the primary winding of an ignition system actually comes in time to increase the secondary voltage? According to my reasoning it comes too late to do any good. Publish graphs or oscillograms showing time relation between primary and secondary voltages after the break. Also show graph giving condenser current after the break. Prefer these taken from battery system so as to avoid effect of magnetic field of magneto.—Ben Johnson, Lewiston, Idaho.

The illustration given shows the typical action in a battery ignition system. At the time the interrupter points make contact the primary current starts to build up. When the interrupter points open the primary current is stopped and not only dropped off to zero, but even reverses as can be seen by the curve falling below the zero line. Current above the line represents discharge from the battery so that the fall of the curve below the line means a temporary charge to the battery; that is, the current has reversed its direction. The only way to account for this is that the rebound from the condenser has caused the reversal.

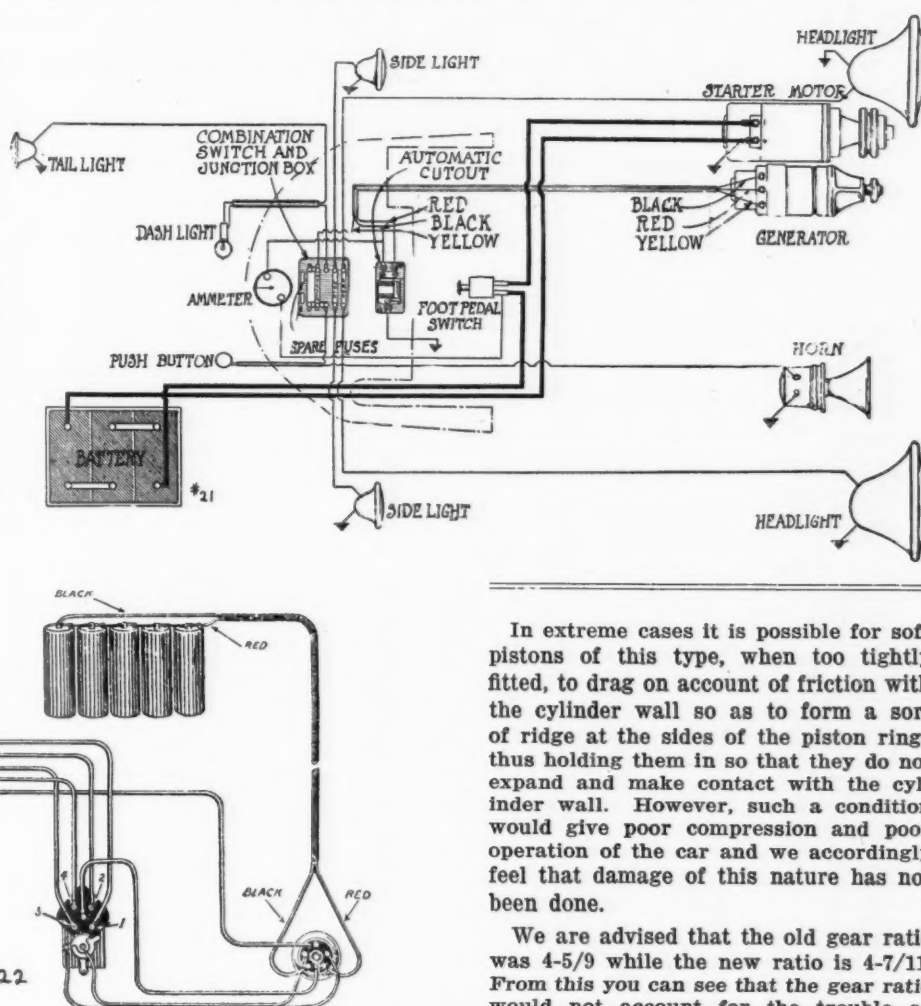
The generation of voltage in the secondary depends on the rapidity with which the primary current may be changed. For example, if in a definite period of time the current can be dropped from 4 amperes to zero a certain effect will be noticed in the secondary. If on the other hand the current can be dropped from 4 amperes to .25 amperes in the reverse direction the effect would be greater for the same relative change takes place as if the primary current had built up to 4.25 amperes and then had been cut down to zero. Accordingly we conclude that the condenser effect or kick-back does have its share in generating the high voltage produced in the secondary.



Two Diagrams for Model 79E Overland

Q—Publish wiring diagram of Overland model 79 E. We should like to know how to operate the dry cell ignition circuit from the starting storage battery.—Lester H. Gunsburg, Cambridge, Mass.

Wiring diagram of the Gray & Davis starting and lighting system used in the model 79 is shown. Wiring of the low tension Splitdorf magneto, which uses battery for starting, is also illustrated. It is impossible to use the storage battery in connection with the Splitdorf magneto for starting. You will notice from the magneto wiring diagram that the dry cells are not grounded and that both wires are brought to the primary of the coil. The storage battery of the starting and lighting system has one terminal grounded, therefore, you can readily see that it will be impossible to use storage battery current for the ignition circuit.



In extreme cases it is possible for soft pistons of this type, when too tightly fitted, to drag on account of friction with the cylinder wall so as to form a sort of ridge at the sides of the piston rings thus holding them in so that they do not expand and make contact with the cylinder wall. However, such a condition would give poor compression and poor operation of the car and we accordingly feel that damage of this nature has not been done.

We are advised that the old gear ratio was 4-5/9 while the new ratio is 4-7/11. From this you can see that the gear ratio would not account for the trouble as the difference is very slight.

OVERHAULED ENGINE LIMITED IN POWER WHILE STILL TIGHT

About six months ago a very good customer brought in his 1920 Maxwell to have the engine overhauled. The car had been driven about 12,000 miles. We took up the bearings, installed a new set of timing gears, noting that the new gears were accurately marked, also refaced the valves and lapped out what little taper there was in the cylinders. Micrometer readings then showed the cylinders to be straight, round and to be .003 oversize, so we installed the new Magnalite pistons .003 oversize with rings and pins as furnished by Maxwell. We also balanced all connecting rods and pistons to less than 1/4 ounce by weighing the entire connecting rod, also by checking up the large end.

Here is the rub, however. Theoretically we have the same engine as used in the first 1922 Maxwell before they started using the three-bearing crankshaft. However, this car does not perform as well as the later one. It does not pull as well nor has it the getaway it seemingly should have when compared with new models. While this car is a 1920 model, it has had spiral gears installed in the rear end, although we do not know whether the ratio is 8 to 33 or 9 to 33. We believe the new car has a gear ratio of 9 to 41. Would the trouble be due to the difference in gear ratio?—Walter Hohlfeld, Edmond, Kas.

We do not think the trouble is in the gear ratio. It is possible, however, that

in installing the new pistons you did not give them enough clearance. You state that you checked the cylinders with a micrometer but make no mention of checking the pistons.

According to one of the Maxwell distributors these pistons are Lynite rather than Magnalite. This Maxwell piston has a spiral slot on one side and this piston should be assembled with the slot away from the valves. When installed in the cylinder it should be possible to push the piston in with a .004 inch thickness gage between the piston and cylinder wall. You possibly took too much for granted when you got the nominal oversize piston and installed it.

It is quite likely that if the car is used carefully it will limber up to the point where it will equal in performance the other Maxwell cars to which you refer. One way you can check to see whether the engine is still tight is to run it a while and then stop the engine and see if it rocks back and forth. You can also check it by cranking by hand after it has run awhile. You will probably find that it is pretty tight and is difficult to turn by hand and does not rock back and forth by itself.

OUTPUT OF VARIOUS ELECTRICAL SYSTEMS

Q—We are giving you the list of a number of electrical systems on which we would like to know the maximum charging current and the speed at which it is obtained.—F. P. Herrmann, Baltimore, Md.

On the model A-25 Apeldo system, on a Pullman car, the generator should have an output of 15 amperes at 1500 r.p.m. On the B-16 volt Jesco system, on Cartercar, the charging rate should be from 10 to 12 amperes, but we have no information on the speed. On the Detroit car, using Remy system, the charging current should be 14.5 amperes at 2200 r.p.m. On the 24-A Remy system, on Reo cars, the charging rate should be 12.5 amperes at 2500 r.p.m. The Heinz 6 volt system, on Regal cars, should show a charging current of 10 to 12 amperes. On the Heinz system on Ford cars we have only the information on the 6 volt system to the effect that the charging current should be 10 to 12 amperes at 10 m.p.h. The Wagner system on the 1920 Studebaker is supposed to give a charging current of about 17 amperes at 1400 r.p.m. while the GF Auto-Lite system should show a charging current of from 16 to 19 amperes at from 2200 to 2800 r.p.m.

RADIATORS, HOSE SIZES AND WATER CAPACITIES ON 1922 MOTOR TRUCKS

Motor Age Maintenance Data Sheet No. 198

MAKE AND MODEL	Tons Capacity	RADIATOR				Water Circulation	Pump Type	HOSE SIZES				Water Capacity of Cooling System (Gals.)
		SHELL		CORE				UPPER†		LOWER†		
		Make	Material	Make	Type			Length (Inches)	Inside Diameter (Inches)	Length (Inches)	Inside Diameter (Inches)	
Ace, 30	1½	Own	Cast I.	Modine	Cellular	Th.-S.	None	10¾	2	7	1¾	4
Acme, G	¾	G. & O.	Pres. S.	G. & O.	Cellular	Th.-S.	None	11	2	11	2	4
Acme, B	1	G. & O.	Pres. S.	G. & O.	Cellular	Th.-S.	None	11	2	11	2	4
Acme, F	1½	Own	Cast I.	G. & O.	Finned T.	Pump	Cent.	8	1½	11½	1½	3½
Acme, A	2-2½	Own	Cast A.	G. & O.	Finned T.	Pump	Cent.	7	1½	11	1½	4½
Acme, AC	2½	Own	Cast I.	Bremer	Finned T.	Pump	Cent.	11½	1½	11½	1½	5
Acme, C	3½	Own	Cast I.	G. & O.	Finned T.	Pump	Cent.	10	1½	13	1½	5
Acme, E	5	Own	Cast I.	G. & O.	Finned T.	Pump	Cent.	11	2	14	2	6½
Akron 20	1½	Fedders	Pres. S.	Fedders	Cellular	Pump	Cent.	9	1½	7½	1½	....
Atterbury, 20R	1½	Own	Cast A.	Long	Finned T.	Pump	Cent.	8	1½	14	1½	....
Atterbury, 7CX	2½	Own	Cast A.	Long	Finned T.	Pump	Cent.	5¾	1½	6¾	1½	....
Atterbury, 7DX	3½	Own	Cast A.	Long	Finned T.	Pump	Cent.	8	1½	6	1½	....
Atterbury, AD	5	Own	Cast A.	Long	Finned T.	Pump	Cent.	14	2	20½	2	10½
Autocar, 21F	1½-2	Own	Sheet B.	Own	Finned T.	Pump	Cent.	4*	1½	....	1½	5
Autocar, 21G	1½-2	Own	Sheet B.	Own	Finned T.	Pump	Cent.	4*	1½	....	1½	5
Autocar, 27K&H	2	Own	Pres. S.	.....	Finned T.	Pump	Cent.	3½*	1½	3½*	1½	7½
Autocar, 26B&Y	5	Own	Cast I.	.....	Finned T.	Pump	Cent.	3½*	1½	3½*	1½	7½
Available, H	1½	Chicago	Cast I.	Chicago	Finned T.	Pump	Cent.	14	1½	18	1½	5½
Available, H	2½	Chicago	Cast I.	Chicago	Finned T.	Pump	Cent.	14	1½	18	1½	5½
Available, H	3½	Chicago	Cast I.	Chicago	Finned T.	Pump	Cent.	14	1½	18	1½	5½
Available, H	5	Chicago	Cast I.	Chicago	Finned T.	Pump	Cent.	14	2	18	2	....
Bessemer, H2	1½	Own	Cast I.	Standard	Cellular	Th.-S.	None	11½	2	10	2	....
Bessemer, J2	2½	Own	Cast I.	Standard	Cellular	Pump	Cent.	12	1½	5	1½	....
Bessemer, K2	4	Own	Cast I.	Standard	Cellular	Pump	Vane	11½	2½	10	2½	....
Bethlehem, KN	1	Own	Pres. S.	G. & O.	Cellular	Th.-S.	None	8¾	2	8	2	5
Bethlehem, GN	2	Own	Cast I.	G. & O.	Cellular	Th.-S.	None	8½	2½	9½	2½	8
Bethlehem, HN	3	Own	Cast I.	G. & O.	Cellular	Th.-S.	None	8½	2½	9½	2½	8
Case, TR	2	.....	.....	.....	.....	.....	.....	7	1½	7	1½	6
Chevrolet, G	¾	Harrison	Pres. S.	Harrison	Cellular	Pump	Cent.	4¾	1½	3¾	1½	1½
Clydesdale, 10	1½	Own	Cast A.	Own	Plain T.	Th.-S.	None	11	2	11	2	7
Clydesdale, 18	¾	Own	Cast A.	Own	Plain T.	Th.-S.	None	15	2	12	2	7
Clydesdale, 20	1	Own	Cast A.	Own	Plain T.	Th.-S.	None	15	2	12	2	7
Clydesdale, 42	1½	Own	Cast A.	Own	Plain T.	Th.-S.	None	15	2	12	2	7
Clydesdale, 65EX	2½	Own	Cast A.	Own	Plain T.	Pump	Cent.	9	1½	14	1½	8½
Clydesdale, 90	3½	Own	Cast A.	Own	Plain T.	Pump	Cent.	9	1½	14	1½	9½
Clydesdale, 120B	5	Own	Cast A.	Own	Plain T.	Pump	Cent.	9	2	19	2	10
Collier, 23	¾	Long	Cast I.	Long	Finned T.	Pump	Cent.	9½	2	13	1½	5
Collier, 18	1	Long	Cast I.	Long	Finned T.	Pump	Cent.	9½	2	13	1½	5
Collier, 21	2	Long	Cast I.	Long	Finned T.	Pump	Cent.	8	1½	10½	1½	6½
Collier, 22	2½	Long	Cast I.	Long	Finned T.	Pump	Cent.	8	1½	10½	1½	6½
Commerce, 16	2	Long	Cast I.	Long	Finned T.	Th.-S.	None	.....	.....	.....	.....	....
Commerce, 18	2½	Long	Cast I.	Long	Finned T.	Pump	Cent.	.....	.....	.....	.....	....
Corbitt, H22	1	McCord	Cast I.	McCord	Finned T.	Th.-S.	None	.....	.....	.....	.....	....
Corbitt, C22	2	McCord	Cast I.	McCord	Finned T.	Pump	Cent.	.....	.....	.....	.....	....
Corbitt, AA22	3½-4	McCord	Cast I.	McCord	Finned T.	Pump	Cent.	.....	.....	.....	.....	....
Day-Elder, A	1	Bush	Cast I.	Bush	Finned T.	Th.-S.	None	9	2	9½	2	4½
Day-Elder, B	1½-2	Bush	Cast I.	Bush	Finned T.	Th.-S.	None	9	2	9½	2	4½
Day-Elder, D	2-2½	Bush	Cast I.	Bush	Finned T.	Pump	Cent.	4	1½	9	1½	5½
Day-Elder, F	3½	Bush	Cast I.	Bush	Finned T.	Pump	Cent.	6¾	1½	12	1½	8
Day-Elder, E	5-6	Bush	Cast I.	Bush	Finned T.	Pump	Cent.	12½	2½	10	1½	9
Dearborn, T	1½	Chicago	Cast I.	Chicago	Finned T.	Th.-S.	None	.....	.....	.....	.....	....
Dearborn, 48	2	Chicago	Cast I.	Chicago	Finned T.	Th.-S.	None	.....	.....	.....	.....	....
Defiance, G	1	Perfex	Cast I.	Perfex	Cellular	Pump	Cent.	10	2	8½	1½	6
Defiance, D	1½	Perfex	Cast I.	Perfex	Cellular	Pump	Cent.	10	2	8½	1½	6
Denby, 31	¾	Long	Cast I.	Long	Finned T.	Th.-S.	None	9	2	12	2	5½
Denby, 33	1½	Long	Cast I.	Long	Finned T.	Th.-S.	None	9	2	12	2	5½
Denby, 134	2	Long	Cast I.	Long	Finned T.	Th.-S.	None	9	2	12	2	5½
Denby, 25	3	Long	Cast I.	Long	Finned T.	Pump	Cent.	9	2	12	2	6
Denby, 27	4	Long	Cast I.	Long	Finned T.	Pump	Cent.	13	1½	16½	1½	10½
Denby, 210	5	Long	Cast I.	Long	Finned T.	Pump	Cent.	13	1½	16½	1½	10½
Dependable, C	1½	Long	Cast I.	Long	Finned T.	Pump	Cent.	14	2½	15	1½	....
Dependable, E	2½	Long	Cast I.	Long	Finned T.	Pump	Cent.	10	2½	11½	1½	....
Diamond T, 03	1½	G. & O.	Cast I.	G. & O.	Finned T.	Pump	Cent.	.....	.....	.....	.....	....
Diamond T, FS	1½	G. & O.	Cast I.	G. & O.	Finned T.	Pump	Cent.	.....	.....	.....	.....	....
Diamond T, S	5	G. & O.	Cast I.	G. & O.	Finned T.	Pump	Gear	.....	.....	.....	.....	....
Dodge Brothers	1½	McCord	Pres. S.	McCord	Plain T.	Pump	Cent.	7	1½	7½	1½	2½
Dorris, K4	2½	McCord	Cast I.	McCord	Cellular	Pump	Cent.	4	1½	3½*	1½	7
Dorris, K7	3½	McCord	Cast I.	McCord	Cellular	Pump	Cent.	4	1½	3½*	1½	7
Dort, 109	1½	Fedders	Pres. S.	Fedders	Cellular	Th.-S.	None	6	2½	15½	2½	5
Duplex, A	1½-2	Modine	Cast I.	Modine	Cellular	Pump	Cent.	.....	.....	.....	.....	....
Duplex, E	3½	Long	Sheet B.	Long	Plain T.	Pump	Cent.	.....	.....	.....	.....	....
Duty	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....
Fageol	1½-2	Own	Cast I.	McCord	Finned T.	Pump	Cent.	15½	1½	11½	1½	....
Fageol	2½-3	Own	Cast I.	McCord	Finned T.	Pump	Gear	9¾	1½	14¾	1½	....
Federal, SD	1-1½	Own	Pres. S.	Long	Finned T.	Pump	Cent.	.....	.....	.....	.....	....
Federal, UE	2-2½	Own	Pres. S.	McCord	Finned T.	Pump	Cent.	.....	.....	.....	.....	....
Federal, EW	3½-4	Own	Pres. S.	Long	Finned T.	Pump	Cent.	.....	.....	.....	.....	....
Federal, X2	5-6	Own	Pres. S.	Long	Finned T.	Pump	Cent.	.....	.....	.....	.....	....
Ford T	1	Own	Pres. S.	Own	Finned T.	Th.-S.	None	4	2	2½	1½	3½
F. W. D., B	3	Own	Cast I.	McCord	Plain T.	Pump	Cent.	4*	2	5*	1½	10½
G. M. C., K16	1	McCord	Pres. S.	McCord	Finned T.	Pump	Cent.	8¾	1½	8¾	1½	5½
G. M. C., K41	2	McCord	Cast I.	McCord	Finned T.	Pump	Cent.	10½	1½	9½*	1½	7½
G. M. C., K71	3½	McCord	Cast I.	McCord	Finned T.	Pump	Cent.	11¾	1½	11¾*	1½	10
G. M. C., K101	5	McCord	Cast I.	McCord	Finned T.	Pump	Cent.	11¾	1½	10	1½	10
Graham Bros.	1-1½	McCord	Pres. S.	McCord	Plain T.	Pump	Cent.	7	1½	7½	1½	2½
Garford, 15	1	Long	Pres. S.	Long	Finned T.	Pump	Vane	.....	.....	.....	.....	....
Garford, 70H	2½	Own	Cast I.	.....	Finned T.	Pump	Vane	.....	.....	.....	.....	....
Garford, 68D	5	Own	Cast I.	.....	Finned T.	Pump	Vane	.....	.....	.....	.....	....
Gary, F	1	Own	Cast I.	Own	Finned T.	Th.-S.	None	.....	.....	.....	.....	....
Gary, J	2½	Own	Cast I.	Own	Finned T.	Pump	Cent.	.....	.....	.....	.....	....
Gary, M	5	Own	Cast I.	Own	Finned T.	Pump	Cent.	.....	.....	.....	.....	....
Gramm-Bern., 10	1	Own	Cast I.	Long	Finned T.	Th.-S.	None	.....	.....	.....	.....	....
G. W. W.	1½	Own	Cast I.	Own	Finned T.	Pump	Cent.	.....	.....	.....	.....	....

MAKE AND MODEL	Tons Capacity	RADIATOR				Water Circulation	Pump Type	HOSE SIZES				Water Capacity of Cooling System (Gals.)
		SHELL		CORE				UPPER†		LOWER†		
		Make	Material	Make	Type			Length (Inches)	Inside Diameter (Inches)	Length (Inches)	Inside Diameter (Inches)	
Harvey, WOA.	2	Chicago	Cast I.	Chicago	Finned T.	Pump	Cent.	8	2	12	1 1/4	6 1/2
Harvey, WHA.	3 1/2	Own	Cast I.	Chicago	Finned T.	Pump	Cent.	8	2	10	1 1/4	11
Harvey, WKA.	5	Own	Cast I.	Chicago	Finned T.	Pump	Vane	8	2	10	1 1/4	10
Hendrickson O.	1 1/2	Chicago	Cast I.	Chicago	Finned T.	Pump	Vane					
Hendrickson N.	4	Chicago	Cast I.	Chicago	Finned T.	Pump	Cent.					
Indiana, 12.	1 1/2-2	McCord	Cast I.	McCord	Finned T.	Pump	Cent.					
Indiana, 25.	2 1/2	McCord	Cast I.	McCord	Finned T.	Pump	Cent.					
Indiana, 51.	5	McCord	Cast I.	McCord	Finned T.	Pump	Cent.					
International, 31.	1 1/2	Long	Press. S.	Long	Finned T.	Pump	Cent.	6	1 1/2	4*	1 1/8	4 1/2
International, 41.	2	Own	Cast I.	Long	Finned T.	Pump	Cent.	6	1 1/2	4*	1 1/8	4 1/2
International, 61.	3	Own	Press. S.	Long	Finned T.	Th.-S.	None	9	2 1/4	14 1/2	2	7 1/2
International, 101.	5	Own	Press. S.	Long	Finned T.	Th.-S.	None	13 1/4	2 1/4	14 1/2	2	
International, S.	5 1/2	Long	Press. S.	Long	Finned T.	Th.-S.	None	9 3/4	2 1/4	17 1/2	2 1/4	5 1/2
Kalamazoo, G1.	1 1/2	Own	Cast I.	Heoven	Cellular	Th.-S.	None	10	2	4 1/2	2	5 1/2
Kalamazoo, G2.	1 1/2	Own	Cast I.	G. & O.	Finned T.	Pump	Cent.	8	1 1/2	18	1 1/2	5 1/2
Kalamazoo, H.	2 1/2	Own	Cast I.	G. & O.	Finned T.	Pump	Cent.	20	1 1/2	20	1 1/2	7
Kalamazoo, K.	3 1/2	Own	Cast I.	G. & O.	Finned T.	Pump	Cent.	20	1 1/2	20	1 1/2	7 1/2
Kalamazoo, K.	5	Own	Cast I.	G. & O.	Finned T.	Pump	Cent.	20	1 1/2	20	1 1/2	7 1/2
Kearns, N.	2	Own	Cast I.	G. & O.	Finned T.	Th.-S.	None	18	2	18	2	4 1/2
Kelley-Springfield, K-34-38.	1 1/2-2 1/2	Cast I.		Finned T.	Pump	Cent.						
Kelley-Springfield, K41-50.	3 1/2	Cast I.		Finned T.	Pump	Cent.						
Kissel.	1			McCord	Finned T.	Pump		12 1/4	1 1/4	10	1 1/2	7 1/4
Kissel.	1 1/2			McCord	Finned T.	Pump		12 1/4	1 1/4	10	1 1/2	7 1/4
Kissel.	2 1/2			McCord	Finned T.	Pump		12 1/4	1 1/4	10	1 1/2	
Kissel.	3 1/2			McCord	Finned T.	Pump		13 3/4	1 1/4	10	1 1/2	
Kleiber.	1	Own	Cast A.	Rome-T.	Finned T.	Pump	Cent.	12	1 1/2	14	1 1/2	10
Kleiber.	2	Own	Cast A.	Rome-T.	Finned T.	Pump	Cent.	12	1 1/2	14	1 1/2	10
Kleiber.	2 1/2	Own	Cast A.	Rome-T.	Finned T.	Pump	Cent.	13	1 1/2	14	1 1/2	12
Kleiber.	5	Own	Cast A.	Rome-T.	Finned T.	Pump	Cent.	17 1/2	2	19 1/2	1 1/2	16
Kleiber.	5	Own	Cast A.	Rome-T.	Finned T.	Pump	Cent.	17 1/2	2	19 1/2	1 1/2	16
Larrabee, X2.	1	Fedders	Pres. S.	Fedders	Cellular	Pump	Cent.	6	1 1/4	14	1 1/4	5
Larrabee, J4.	1 1/2	Own	Cast I.	Bush	Finned T.	Pump	Cent.	6 1/2	1 1/2	10	1 1/2	6
Larrabee, K4.	2 1/2	Own	Cast I.	Rome-T.	Finned T.	Pump	Cent.	6	1 1/2	11	1 1/2	9
Larrabee, L4.	3 1/2	Own	Cast I.	Rome-T.	Finned T.	Pump	Cent.	6	1 1/2	11	1 1/2	9
Larrabee, EW.	5	Own	Cast I.	Bush	Finned T.	Pump	Cent.	8 1/2	2	17 1/2	2	15
Maccar, L2.	1 1/2	Bush	Cast I.	Bush	Finned T.	Pump	Cent.	....	....	....	....	....
Maccar, H2.	3	Cast I.		Bush	Finned T.	Pump	Cent.	....	....	....	....	....
Maccar, G.	5	Bush	Cast I.	Bush	Finned T.	Pump	Cent.	....	....	....	....	....
MacDonald, A.	7 1/2	Own		Modine	Plain T.	Pump	Cent.	....	....	....	....	....
Mack, AB.	1 1/2	Own	Sheet B.	Own	Cellular	Pump	Cent.	9 1/2	1 1/4	4 1/4	1 1/4	3 1/4
Mack, AB.	2	Own	Sheet B.	Own	Cellular	Pump	Cent.	9 1/2	1 1/4	4 1/4	1 1/4	3 1/4
Mack, AC.	3 1/2	Own	Cast A.	Own	Plain T.	Pump	Cent.	5 1/4	2 1/4	4 1/4	1 1/4	10 1/2
Mack, AB.	5	Own	Sheet B.	Own	Cellular	Pump	Cent.	9 1/2	1 1/4	4 1/4	1 1/4	10 1/2
Mack, AC.	5	Own	Cast A.	Own	Plain T.	Pump	Cent.	5 1/4	2 1/4	4 1/4	1 1/4	10 1/2
Mack, AC.	5	Own	Cast A.	Own	Plain T.	Pump	Cent.	5 1/4	2 1/4	4 1/4	1 1/4	10 1/2
Mack, AC.	6 1/2	Own	Cast A.	Own	Plain T.	Pump	Cent.	5 1/4	2 1/4	4 1/4	1 1/4	10 1/2
Mack, AC.	7-15	Own	Cast A.	Own	Plain T.	Pump	Cent.	5 1/4	2 1/4	4 1/4	1 1/4	10 1/2
Master, LW.	1 1/2	Own	Cast I.	Chicago	Finned T.	Pump	Cent.	....	....	....	....	....
Master, A.	3 1/2	Own	Cast I.	Chicago	Finned T.	Pump	Cent.	....	....	....	....	....
Master, B.	5	Own	Cast I.	Chicago	Finned T.	Pump	Cent.	....	....	....	....	....
Menominee, HT.	1	Own	Cast I.	G. & O.	Finned T.	Pump	Cent.	9 1/4	1	10 1/2	1 1/4	5 1/2
Menominee, H.	1 1/2	Own	Cast I.	G. & O.	Finned T.	Pump	Cent.	9 1/4	1	10 1/2	1 1/4	5 1/2
Menominee, D.	3	Own	Cast I.	G. & O.	Finned T.	Pump	Cent.	3*	1 1/2	3*	1 1/2	7 1/2
Menominee, G.	3 1/2	Own	Cast I.	G. & O.	Finned T.	Pump	Cent.	3*	1 1/2	3*	1 1/2	7 1/2
Menominee, J3.	5	Own	Cast I.	G. & O.	Finned T.	Pump	Cent.	3*	1 1/2	3*	1 1/2	7 1/2
Moline, 10.	1 1/2	Own	Cast I.	Modine	Finned T.	Th.-S.	None	10 1/2	2 1/4	4 1/2	2 1/4	6
Moreland, RR.	1	Own	Cast A.		Sheet B.	Pump	Cent.	....	....	....	....	....
Moreland, AX.	3	Own	Cast A.		Sheet B.	Pump	Cent.	....	....	....	....	....
Moreland, RX.	5	Own	Cast A.		Sheet B.	Pump	Cent.	....	....	....	....	....
Netco, HL.	2 1/2	Own	Cast A.	E. & M.	Finned T.	Pump	Cent.	12	1 1/2	16	1 1/2	
Nash, 2018.	1-1 1/2		Cast I.	Long	Finned T.	Pump	Cent.	....	....	....	....	....
Nash, 5018.	2 1/2		Cast I.	Long	Finned T.	Pump	Cent.	....	....	....	....	....
Noble, B30.	1 1/2	Chicago	Cast I.	Chicago	Finned T.	Pump	Cent.	7	1 1/8	16 1/2	1 1/4	6 1/2
Noble, C40.	2	Chicago	Cast I.	Chicago	Finned T.	Pump	Cent.	9	2	12	1 1/4	7
Noble, D50.	2 1/2	Chicago	Cast I.	Chicago	Finned T.	Pump	Cent.	9	2	12	1 1/4	7 1/2
Noble, E70.	3 1/2	Chicago	Cast I.	Chicago	Finned T.	Pump	Cent.	13 1/2	2	16 1/2	1 1/4	10 1/2
Norwalk, 25E.	1	Own	Cast I.	Standard	Cellular	Th.-S.	None	9 1/2	2 1/8	19	2 1/8	6
Norwalk, 35E.	1 1/2	Own	Cast I.	Standard	Cellular	Th.-S.	None	9 1/2	2 1/8	19	2 1/8	6
Old Reliable, A.	1 1/2	Chicago	Cast I.	Chicago	Finned T.	Pump	Cent.					
Old Reliable, C.	3 1/2	Chicago	Cast I.	Chicago	Finned T.	Pump	Cent.					
Old Reliable, K&L.	7	Chicago	Cast I.	Chicago	Finned T.	Pump	Cent.					
Oldsmobile, T.	1	Own	Pres. S.	Harrison	Cellular	Pump	Vane	6 1/4	1 1/4	10 1/2	1 1/4	14
Oneida, B9.	1 1/2	Modine	Cast I.	Modine	Cellular	Pump	Cent.					
Oneida, E9.	5	Modine	Cast I.	Modine	Cellular	Pump	Cent.					
Packard, EX.	2	Fedders	Cast I.	Fedders	Finned T.	Pump	Cent.	6 1/4	1 1/2	10 1/2	1 1/2	6 1/4
Packard, ED.	3	Fedders	Cast I.	Fedders	Finned T.	Pump	Cent.	6 1/4	1 1/2	10 1/2	1 1/2	8
Packard, EF.	5	Fedders	Cast I.	Fedders	Finned T.	Pump	Cent.	6 1/4	1 1/2	10 1/2	1 1/2	8 1/2
Paige, 52.	1 1/2	Own	Cast I.	National	Finned T.	Pump	Cent.	8	1 1/2	12	1 1/2	5 1/2
Paige, 54.	2 1/2	National	Cast I.	National	Finned T.	Pump	Cent.	10 1/4	1 1/2	10 1/4	1 1/2	6 1/2
Paige, 51.	3 1/2	National	Cast I.	National	Finned T.	Pump	Cent.	13	1 1/2	13	1 1/2	7
Parker, G1.	2 1/2	Own	Cast I.	Bremer	Finned T.	Pump	Cent.	19	1 1/2	16 1/2	1 1/2	6 1/2
Parker, J20.	3 1/2	Own	Cast I.	Bremer	Finned T.	Pump	Cent.	19	1 1/2	16 1/2	1 1/2	7
Parker, M20.	5	Own	Cast I.	Bremer	Finned T.	Pump	Cent.	14	1 1/2	18	1 1/2	11
Patriot, Revere.	1	B. & W.	Pres. S.	B. & W.	Plain T.	Th.-S.	None	8	1 1/8	11	1 1/8	7
Patriot, Lincoln.	2	Own	Cast I.	B. & W.	Plain T.	Pump	Cent.	8	1 1/4	6 1/4*	1 1/4	7
Patriot, Washington.	3	Own	Cast I.	B. & W.	Plain T.	Pump	Cent.	6 1/2	1	8	1 1/4	
Pierce Arrow, X5.	2	Own	M. Iron	Rome-T.	Finned T.	Pump	Cent.	16 1/2	2 1/2	14 1/4	2 1/2	
Pierce Arrow, W2.	3 1/2	Own	M. Iron	Rome-T.	Finned T.	Pump	Cent.	11	2 1/2	15 1/2	2 1/2	
Pierce Arrow, R10.	5	Own	M. Iron	Rome-T.	Finned T.	Pump	Cent.	11	2 1/2	15 1/2	2 1/2	
Pittsburgher, C21.	3	Own	Cast I.	G. & O.	Finned T.	Pump	Cent.	6	2 1/4	16	1 1/4	13
Rainier, R21.	1 1/2	Harrison	Pres. S.	Harrison	Cellular	Th.-S.	None	10	2	6	2	
Rainier, R19.	1	Harrison	Pres. S.	Harrison	Cellular	Th.-S.	None	10	2	6	2	
Rainier, R16.	1 1/2	Harrison	Pres. S.	Harrison	Cellular	Th.-S.	None	10	2	6	2	
Rainier, R18.	2	E. & O.	Cast I.	E. & O.	Finned T.	Pump	Cent.	5 1/2	1 1/2	14	1 1/2	
Rainier, R20.	3 1/2	E. & O.	Cast I.	E. & O.	Finned T.	Pump	Cent.	8 1/2	1 1/2	14 1/2	1 1/2	
Rainier, R15.	3 1/2	E. & O.	Cast I.	E. & O.	Finned T.	Pump	Cent.	8 1/2	1 1/2	14 1/2	1 1/2	
Rainier, R17.	5	E. & O.	Pres. S.	Own	Finned T.	Pump	Cent.	5 1/2	1	5 1/2	1	3 1/4
Reo, F.	3 1/2-1 1/4	Own	Cast I.	G. & O.	Cellular	Th.-S.	None	12	2 1/4	18 1/2	2 1/4	5
Republic, 75.	1	Own	Cast I.	G. & O.	Cellular	Th.-S.	None	12 1/4	2	6	2	6
Republic, 10.	1 1/2	Own	Cast I.	G. & O.	Cellular	Th.-S.	None	12 1/4	2	6	2	6
Republic, 11X.	2 1/2	Own	Cast I.	G. & O.	Cellular	Pump	Cent.	8	1 1/2	11 1/4	1 1/4	7 1/2
Republic, 19.	3 1/2	Own	Cast I.	G. & O.	Cellular	Pump	Cent.	7 1/4	1 1/4	2 1/4*	1 1/4	
Republic, 20.	1 1/2	Own	Cast I.	G. & O.	Cellular	Pump	Cent.	....	....	....	....	....
Rowe, CW.	3	Fedders	Sheet B.	Fedders	Cellular	Pump	Cent.	....	....	....	....	....
Rowe, GSW.	5	Fedders	Sheet B.	Fedders	Cellular	Pump	Cent.	....	....	....	....	....
Rowe, FW.	1	Own	Cast I.	Perfex	Sheet B.	Pump	Cent.	5	2	10*	2	
Ruggles, 20.	2	Own	Cast I.	Perfex	Sheet B.	Pump	Cent.	7 1/2	2	13 1/2	1 1/4	2 1/4
Ruggles, 40.	3 1/2	Own	Cast I.	Motor	Plain T.	Pump	Cent.	6 1/2	1 1/4	7 13		

MAKE AND MODEL	Tons Capacity	RADIATOR				Water Circulation	Pump Type	HOSE SIZES				Water Capacity of Cooling System (Gals.)
		SHELL		CORE				UPPER†		LOWER†		
		Make	Material	Make	Type			Length (Inches)	Inside Diameter (Inches)	Length (Inches)	Inside Diameter (Inches)	
Sandow, G.	1	Own	Cast I.	Chicago	Finned T.	Th.-S.	None	....	....	....	....	....
Sandow, J.	2½	Own	Cast I.	Chicago	Finned T.	Pump	Cent.	....	....	....	....	....
Sandow, L.	5	Own	Cast I.	Chicago	Finned T.	Pump	Cent.	....	....	....	....	....
Sanford, 125.	2½	McCord	Cast I.	McCord	Finned T.	Pump	Cent.	6	1¼	11	1¼	6
Sanford, 135.	3½	McCord	Cast I.	McCord	Finned T.	Pump	Cent.	8*	2	11	1¼	7
Sanford, 150.	5	McCord	Cast I.	McCord	Finned T.	Pump	Cent.	8*	2	11	1¼	7
Schacht, F.	2	Own	Cast I.	Bremer	Finned T.	Pump	Cent.	11	2	14	1¼	5½
Schacht, F.	3	Own	Cast I.	Bremer	Finned T.	Pump	Cent.	11	2	14	1¼	5½
Schacht, E.	4	Own	Cast I.	Bremer	Finned T.	Pump	Cent.	10½	2	13½	1¼	6½
Schacht, E.	5	Own	Cast I.	Bremer	Finned T.	Pump	Cent.	10½	2	13½	1¼	6½
Schwartz, A.	1¼	Own	Cast I.	G. & O.	Cellular	Th.-S.	None	9¼	2¼	13	2¼	....
Schwartz, B2W	2	Own	Cast I.	Fedders	Cellular	Pump	Cent.	10	1½	18	1½	....
Schwartz, C2W	3	Own	Cast I.	Fedders	Cellular	Pump	Cent.	10½	2	15	1½	....
Schwartz, DW	5	Own	Cast I.	Fedders	Cellular	Pump	Cent.	12½	2	17	1½	....
Selden, A.	1½	Long	Cast I.	Long	Finned T.	Th.-S.	None	....	....	....	....	....
Selden, A.	3½	Long	Cast I.	Long	Finned T.	Pump	Cent.	....	....	....	....	....
Selden, A.	5	Long	Cast I.	Long	Finned T.	Pump	Cent.	....	....	....	....	....
Service, 15	¾-1	Long	Pres. S.	Long	Finned T.	Pump	Cent.	11¼	1½	3	1¼	3½
Service, 31	1½	McCord	Cast I.	McCord	Finned T.	Pump	Cent.	10	2	8	1¼	6
Service, 36	1½-2	McCord	Cast I.	McCord	Finned T.	Pump	Cent.	10	2	8	1¼	6
Service, 51	2½-3	McCord	Cast I.	McCord	Finned T.	Pump	Cent.	10	2	8	1¼	6
Service, 71	3½	McCord	Cast I.	McCord	Finned T.	Pump	Cent.	10	2	8	1¼	7
Service, 101	5	McCord	Cast I.	McCord	Finned T.	Pump	Cent.	10	2	10	1¼	10
Signal, J.	1	Own	Cast I.	McCord	Finned T.	Pump	Cent.	....	....	....	....	....
Signal, J.	2½	Own	Cast I.	McCord	Finned T.	Pump	Cent.	....	....	....	....	....
Signal, R.	5	Own	Cast I.	McCord	Finned T.	Pump	Cent.	....	....	....	....	....
Standard, 1K	1½	Long	Cast I.	Long	Finned T.	Pump	Cent.	10½	2	13½	1¼	4½
Standard, 76	2½	Long	Cast I.	Long	Finned T.	Pump	Cent.	Special	....	12	1¼	5½
Standard, 66	3½	Long	Cast I.	Long	Finned T.	Pump	Cent.	12	1½	18	1¼	7½
Standard, K	5	Long	Cast I.	Long	Finned T.	Pump	Cent.	8	2	3¼*	2	9½
Sterling	1½	Own	Cast I.	McCord	Cellular	Pump	Vane	11¼	1½	19½	1½	9
Sterling	2	Own	Cast I.	McCord	Cellular	Pump	Vane	11½	1½	19½	1½	9
Sterling	2½	Own	Cast I.	McCord	Cellular	Pump	Vane	11½	1½	19½	1½	9
Sterling	3½	Own	Cast I.	McCord	Cellular	Pump	Vane	14½	1½	22½	1½	10
Sterling	5	Own	Cast I.	McCord	Cellular	Pump	Vane	11½	1½	19½	1½	10
Sterling	7½	Own	Cast I.	McCord	Cellular	Pump	Vane	11½	1½	19½	1½	10
Stewart, 15	1	Bush	Cast I.	Bush	....	....	....	....	....	....	....	....
Stewart, 10X	3½	Bush	Cast I.	Bush	....	....	....	....	....	....	....	....
Stoughton	¾	Chicago	Sheet B.	Chicago	....	....	....	....	....	....	....	....
Stoughton, B.	1½	Own	Cast I.	....	Finned T.	Pump	Cent.	....	....	....	....	....
Stoughton, F.	3	Own	Cast I.	....	Finned T.	Pump	Cent.	....	....	....	....	....
Sullivan, E.	2	Own	Cast I.	Bush	Finned T.	Pump	Cent.	9	2	9¼	1¼	7½
Sullivan, H.	3½	Own	Cast I.	Bush	Finned T.	Pump	Cent.	13¼	2	18¼	1¼	10
Tiffin, GW	1½	Own	Cast I.	G. & O.	Finned T.	Pump	Cent.	5½	1½	13¼	1¼	6½
Tiffin, MW	2½	Own	Cast I.	G. & O.	Finned T.	Pump	Cent.	9½	1½	11½	1¼	6½
Tiffin, F35	3½	Own	Cast I.	G. & O.	Finned T.	Pump	Cent.	9	1½	18	1¼	8
Tiffin, TW	5	Own	Cast I.	G. & O.	Finned T.	Pump	Cent.	8	2	21	2	10
Tiffin, UW	6	Own	Cast I.	G. & O.	Finned T.	Pump	Cent.	8	2	21	2	10
Titan	2½	Own	Cast I.	....	Finned T.	Pump	Cent.	....	....	....	....	....
Titan	5-6	Own	Cast I.	....	Finned T.	Pump	Cent.	....	....	....	....	....
Traffic	1½	Own	Cast I.	Own	Sheet B.	Th.-S.	None	10½	2	10½	2	6
Traffic	2	Own	Cast I.	Own	Sheet B.	Th.-S.	None	10½	2	10½	2	6
Traffic	3½	Own	Cast I.	Own	Sheet B.	Th.-S.	None	10½	2	10½	2	6
Transport, 20	1	Own	Cast I.	Modine	Cellular	Th.-S.	None	12	2	12	2	6
Transport, 30	1½	Own	Cast I.	Modine	Cellular	Th.-S.	None	10½	2	13	2	5½
Transport, 50	2½	Own	Cast I.	Modine	Cellular	Pump	Cent.	9¼	2	2¼*	1½	6½
Transport, 50	2½	Own	Cast I.	Modine	Cellular	Pump	Cent.	9	1½	16	1½	5½
Transport, 70	3½	Own	Cast I.	Modine	Cellular	Pump	Cent.	12	2	16	1½	10½
Traylor, B.	1½	G. & O.	Cast I.	G. & O.	Finned T.	Th.-S.	None	....	....	....	....	....
Traylor, D.	3	G. & O.	Cast I.	G. & O.	Finned T.	Pump	Cent.	....	....	....	....	....
Traylor, F.	5	G. & O.	Cast I.	G. & O.	Finned T.	Pump	Cent.	....	....	....	....	....
Triangle, AA	1½	Perfex	Pres. S.	Perfex	Plain T.	Pump	Cent.	18	2	18	2	6
Triangle, B	2½	Wheeler	Cast I.	Wheeler	Finned T.	Pump	Cent.	9	1½	18	1½	9
Ultimate, A	2	Own	Cast I.	Bush	Finned T.	Pump	Cent.	11	2	5*	1½	6
Ultimate, BB	3	Own	Cast I.	Bush	Finned T.	Pump	Cent.	11	2	5*	2¼	6
United, AT	1½	Own	Cast I.	Modine	Finned T.	Pump	Cent.	....	....	....	....	....
United, CT	3½	Own	Cast I.	Modine	Finned T.	Pump	Cent.	....	....	....	....	....
United States, N.	1½	Long	Cast I.	Long	Finned T.	Pump	Cent.	11½	2	9	1¼	5½
United States, R.	3	Long	Cast I.	Long	Finned T.	Pump	Cent.	10	1½	9	1¼	8
United States, S.	4	Long	Cast I.	Long	Finned T.	Pump	Cent.	9	1½	8	1½	10
United States, T.	6	Long	Cast I.	Long	Finned T.	Pump	Cent.	15	2	13	1½	15
Velie, 46	1½	Own	Cast I.	McCord	Finned T.	Pump	Cent.	9	2	12	1½	4¼
Vim, 50	¾	Own	Pres. S.	McCord	Finned T.	Th.-S.	None	9¼	1½	18	1½	7
Vulcan, 25	2½	Own	Cast I.	Long	Finned T.	Pump	Cent.	13½	1½	12*	1½	8
Walker-Johnson, A.	2	Own	Cast I.	Bush	Finned T.	Pump	Cent.	11¼	2	2¼	1½	7
Walker-Johnson, B.	3	Own	Cast I.	Bush	Finned T.	Pump	Cent.	10	2	8	1½	7½
Walter, S.	5	Bush	Cast I.	Bush	Finned T.	Pump	Cent.	10	1½	15	1½	10
White, 15	¾	Sheet B.	....	....	Cellular	Pump	Cent.	....	....	....	....	....
White, 20	2	Sheet B.	....	....	Cellular	Pump	Cent.	....	....	....	....	....
White, 45	5	Sheet B.	....	....	Cellular	Pump	Cent.	....	....	....	....	....
Wichita, L.	1½	E. & M.	Cast I.	E. & M.	Finned T.	Pump	Cent.	18	1½	13½	1¼	5
Wichita, M.	2	E. & M.	Cast I.	E. & M.	Finned T.	Pump	Cent.	18	1½	13½	1¼	5
Wichita, RX	3	E. & M.	Cast I.	E. & M.	Finned T.	Pump	Cent.	16	1½	18	1½	7
Wichita, S.	5	E. & M.	Cast I.	E. & M.	Finned T.	Pump	Cent.	18	1½	20	1½	8½
Wilcox, A.	1	Own	Pres. S.	Long	Finned T.	Pump	Cent.	12	2	17	1½	3
Wilcox, B.	1½	Own	Cast A.	Long	Finned T.	Pump	Cent.	12	1½	12	1½	....
Wilcox, C.	2½	Own	Cast A.	Long	Finned T.	Pump	Cent.	12	1½	12	1½	....
Wilcox, E.	3½	Own	Cast A.	Long	Finned T.	Pump	Cent.	13½	2	19	1½	....
Wilcox, F.	5	Own	Cast A.	Long	Finned T.	Pump	Cent.	16	2	18½	1½	....
Wilson, F.	1½	Long	Cast I.	Long	Finned T.	Th.-S.	None	....	....	....	....	....
Wilson	3½	Long	Cast I.	Long	Finned T.	Pump	Cent.	....	....	....	....	....
Wilson, H.	5	Long	Cast I.	Long	Finned T.	Pump	Cent.	....	....	....	....	....
Winther, 751	¾	Own	Cast I.	Bremer	Plain T.	Th.-S.	None	15¼	2	17	2	7
Winther, 39	1½	Own	Cast I.	Bremer	Plain T.	Pump	Cent.	10	1½	3¾*	1½	9
Winther, 430	1½	Own	Cast I.	Bremer	Plain T.	Pump	Cent.	11¼	1½	11¼	1½	9
Winther, 450	2½	Own	Cast I.	Bremer	Plain T.	Pump	Cent.	11¼	1½	11¼	1½	9
Witt Will	1½-2	Bremer	Cast I.	Bremer	Cellular	Pump	Cent.	8	1½	12	1½	7
Witt Will, P.	2½	Bremer	Cast I.	Bremer	Cellular	Pump	Cent.	8	1½	12	1½	....

†—Unless otherwise specified one each is required per truck, *—Two pieces required, §—Other models with increased capacities have similar specifications, ‡These specifications are the same for 7½, 10, 13 and 15 ton truck tractors. E. & M.—English & Mersick, Rome-T.—Rome-Turney, Cast A.—Cast Aluminum, Cast I.—Cast Iron, Pres. S.—Pressed Steel, Sheet B.—Sheets Brass, Finned T.—Finned Tube, Plain T.—Plain Tube, Th.-S.—Thermo-Siphon, Cent.—Centrifugal.

Battery Advertising Undergoing Investigation

Misleading Statements in Publicity Undermining Confidence of Buying Public, Verdict of Advertising Vigilance Committee. Prosecutions Threatened

THE following statement from the National Vigilance Committee of the Associated Advertising Clubs of the World supports many views expressed from time to time in *MOTOR AGE*. This committee, which has attained much success in eliminating fraud from advertising, promises that battery advertising will be subjected to a close inspection and untruthful copy will be called to the attention of the producer for revision. If revision is not forthcoming, that prosecutions will follow.

This, we believe, is as it should be. This committee has accomplished much in the way of putting tire advertising on a better level and it will be an excellent thing for the battery industry when the battery publicity is cleaned up. The full text of the Vigilance Committee statement follows:

Preliminary Investigation

Certain practices in which a considerable number of manufacturers, distributors and service station dealers in the automotive electrical field, particularly the battery trade, are now indulging, are not only misleading and deceptive but in numerous instances partake of actual fraud. Complaints coming to the National Vigilance Committee of the Associated Advertising Clubs of the World from widely divergent sources indicate that such abuses are not sporadic, but are quite general in many localities, and that prompt steps in abatement must be taken unless they are to become more or less the general rule.

The National Vigilance Committee has made a preliminary survey in this field, and has concluded that there is need to extend its activities, and to take definite action in order to preserve the full confidence of the public in the advertising of these commodities.

The National Vigilance Committee in cooperation with its affiliated Better Business Bureaus throughout the country, proposes to direct its attention to these practices, in order that the public may be protected and given a dependable guide, and that legitimate concerns be provided with a standard on which better business methods may be permanently built.

Deceptive Guarantees

No phase of battery advertising has been more abused than the guarantee clause or certificate. A perusal of current copy discloses that guarantees of all sorts are being made and to unbelievable extents.

Prospective purchasers are told by one manufacturer that its batteries are "Unconditionally Guaranteed for a Year." The next says "Unconditionally Garan-

teed for Two Years," and so on, one outdoing the other until three, four and five year limits are reached, and the time guarantee becomes preposterous, incapable of fulfillment, and of no advertising value to the reputable manufacturer who may care to use a guarantee.

Other battery makers state that their product "Will Out-last the Car," and "Buy the.....Battery and your Troubles are Over." To meet these claims competitors counter—"Outlasts Four Ordinary Batteries," "Will Outlast any other Battery on the Market," "Will Outlive any Two Batteries you have ever used." Comparative advertising of this sort inevitably results in grossly exaggerated claims which react in a detrimental manner.

In addition to these there are the guarantees made for the second-hand or so-called "Rebuilt" or "Reconstructed" batteries, which are being offered and sold to motorists with the guarantee of the rebuilder. When trouble comes the user often learns to his sorrow, that he has simply purchased a "Guarantee" and not a battery.

It is not intended to convey the thought that all guarantees are unreasonable and worthless, but the public should know whether the guarantee is that of a manufacturer, who is willing and capable of making good the terms given, or that of some irresponsible party who uses the guarantee only as a means of making a sale.

"A Guarantee is only as Good as its Maker," and this should be borne in mind at all times.

"Dope" Solutions

From divers sources, complaints have come to the National Vigilance Committee that the motoring public is being imposed upon, from time to time, by unscrupulous concerns who offer a remedy for all battery troubles through the medium of pastes, fillers, solutions and other compounds to take the place of regular electrolytes. Tests and analysis of several of these "dope" solutions, indicate that while they apparently give a battery greater momentary "kick," they oftentimes contain ingredients which are absolutely ruinous to the plates and separators, thereby shortening the life of the battery from fifty to seventy-five per cent.

Purchasers should inquire carefully regarding such solutions and assure themselves that the substitute they are procuring has real merit and will not damage the battery, before placing their orders.

Dry Batteries

Another misleading and sometimes fraudulent situation attends the manner

in which many so-called "dry batteries" are advertised. Some of these are exploited as "new and wonderful" inventions that "never need to be taken to a service station," that "require no water" nor added charge "no matter how long in use," "cannot freeze," etc.

The vast majority of such batteries are in reality semi-dry storage batteries, in which silicate of soda or infusorial earths are used to keep the acid in solution. Either of these materials acts in about the same capacity as a blotter, and tends to cut down rather than increase circulation, and hence the capacity of the battery.

Simple electrical tests show that many of these batteries will not stand up to the claims which their makers make for them. Here, as with the substitute electrolytes, the purchaser should investigate carefully, and assure himself the battery has real merit before he buys.

Substitutions of Parts

Some service stations, known and advertised as the authorized station for a named manufacturer, are prone to trade upon the established reputation of the manufacturer and carry on a questionable business in the substitution of foreign and oftentimes inferior parts in the reconstruction of batteries.

The automobile owner is at the mercy of a battery service station in the matter of having his battery charged, changed, rebuilt, or repaired, for it is impractical to dis-assemble a battery and identify the parts. If he wants the repair parts put out by the maker of his battery, he is entitled to receive them, even though there may be repair parts made by others, which could be used just as efficiently. Substitution under such circumstances constitutes a fraud upon the public and jeopardizes the good will and reputation of the battery manufacturer which the station purports to represent.

Warning

The National Vigilance Committee, including its Better Business Bureaus, proposes to curb, and if need be, to aid in the prosecution of matters in the automotive electrical field, where fraudulent or deceptive advertising is involved. It is inaugurating a vigorous campaign of investigation in an effort to abolish conditions which threaten to become injurious to an important industry.

Manufacturers, distributors, and jobbers, who are jealous of their reputation and that of the products which they market, can lend material aid by calling to the Committee's attention specific abuses of the character herein described. Prompt attention is assured.

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Green Bay, Wis.	Annual Automobile Show	Aug. 27-30
Chicago	Commercial Vehicle Show	Sept. 1-7
Sacramento	Annual Automobile Show	Sept. 3-8
Indianapolis	Annual Fall Automobile and Accessory Show	Sept. 3-8
Memphis	Annual Automobile Show	Sept. 28-30
Fresno, Calif.	Automobile Show	Sept. 28-Oct. 5
New York	Annual Closed Car Show	Oct. 1-6
Little Rock, Ark.	Annual Automobile Show	Oct. 8-13
Chicago	Chicago Closed Car Show, Coliseum	Oct. 13-20
Dallas, Texas	Annual Fall Show	Oct. 13-23
Washington, D. C.	Closed Car Show	Oct. 20-27
Washington, D. C.	Annual Fall Automobile Show	Oct. 28-31
Waco, Texas	Waco Automobile Dealers' Assn.	Oct. 28-Nov. 5
New York	Foreign Automotive Association Exposition	Nov. 4-10
New York	Annual Salon, Hotel Commodore	Nov. 11-17
Chicago	Annual Salon, Drake Hotel	Jan. 26-Feb. 2, 1924
Dallas, Texas	Annual Automobile Show	Feb. 11-17, 1924

RACES

Pikes Peak Hill Climb	Sept. 3
Italy Monza Speedway, 500 miles	Sept. 9

CONVENTIONS

Chicago	National Conference of Trade Association Secretaries and Managers under the auspices of the National Automobile Dealers' Assn.	July 23-24
Olympia, Wash.	Convention Washington Automotive Trade Association	July
Mobile, Ala.	Semi-Annual Meeting of the Alabama Automotive Trades Association	July 23
Eric, Pa.	Annual Convention, Pennsylvania Automotive Association	Aug. 13-14
Chicago	Exhibit and Convention of Automotive Equipment Association	Nov. 12-17
New York	National Tire Dealers' Assn. Convention	Nov. 13-15

SQUEEKS & RATTLES

Send Some Sob Chasers

It's Human Nature

By "Kay Em" Roberts

Last winter, with it's ice and snow, was quite a trial to me; from Arctic lands the wind would blow to sink the mercury, and I was forced, by dint of need, to face each stinging gale for I had sundry mouths to feed and needs must earn the kale. On many days I ventured forth to ply my irksome trade while icy zephyrs from the north around my whiskers played; they whistled through my summer clothes, raced up and down my spine and hung their trade mark on my nose, as colorful as wine. So cold and wretched was I then I sometimes longed to die, but well I knew there'd come again sweet summer, bye and bye, when I'd no longer shake and freeze, nor wish that I were dead and planted out beneath the trees with lilies 'round my head. And lo, the summertime has come with it's accustomed heat and I am punk and on the bum and do not care to eat. The perspiration rolls in streams from off my torrid map and I have terrifying dreams each time I try to nap. I find no solace in the shade where kindred mortals swelt, I've drowned myself in lemonade but still I roast and melt. There's yet to come, I know, the worst—the hottest days of all—and I shall parch and die of thirst ere comes the cooling fall. Oh, summer was not meant for me and I would see it wane; I'll celebrate with one grand spree when winter comes again.

Experience Teaches

The flivverboob ignored the signal.

An Essex knocked him for a row of brick mufflers.

The usual argument.

Which he won by saying to the fair occupant of the Essex: "Lady, I been in lotsa accidents, an' I know you was wrong."

—DICK.

J. M. Ravenna Takes His Scissors in Hand

A motorist and his wife traveling over a familiar road came to a sign pointing to Bangor. The reversed arrow pointed to Monroe.

"That sign is exactly reversed," said the driver to his wife. "Bangor is the other way."

"I guess the sign is more apt to be right than you, Fred," answered his wife, with conjugal emphasis. "Go right in and inquire at that farmhouse."

Fred obeyed, and the farmer answered, "Yes, that sign ought to be over on this side the road, but when we tried to set it, we struck a ledge, so we stuck her over there."

"But," remonstrated Fred, "it makes the directions the wrong way around."

"I know it does," said the farmer, "but anybody knows enough to git to Bangor."—Harper's Magazine.

Maybe the Chinese are mad because every night while we are going to bed they are getting up.

Lima Beane says the problem now is to determine the wave length of a mosquito.

Mrs. Borden Harriman said at a dinner in New York, "I am glad to see the psychanalysis craze is dying out. Psychanalysis solved all the problems of modern life, but the solutions were just about as satisfactory as the school boy's. 'James,' said a school teacher, 'why are the days so short in winter?' 'Because,' James answered, 'the nights are so long.'"—Houston Post.

If your motor is missing, keep cheerful. So many people find their entire cars missing.—Buffalo News.

A country full of filling stations has a lot of nerve to complain of Chinese bandits.—New York Evening Telegram.

The only thing that works twenty-four hours on a stretch in these soft times is a rubber-band.—Binghamton Sun.

Scientists have found a petrified man who has sat with his feet elevated for thousands of years. Probably a primitive jobholder.—Pittsburgh Dispatch.

McAdoo Pushes Ford.—Headline. Many another man has done the same.—Little Rock (Arkansas) Gazette.

WANTED—Single man for small retail milk route and general farm work; must know how to milk and drive Ford car.—Classified Ad in The Rural New Yorker.

A puncture is a little hole found in motor-car tires at long distances from phones or garages.—Burlington Junction Post.

Dear Ed:

A vacation's the thing, all right. Now I know what it must be like to have a lot of money and with nothing to do but hire people to spend it. At present, however, this latter stunt is not at all necessary. Here is what my daily routine consists of now:

Rise: 6:30, look at the clock, laugh and go back to bed again.

Breakfast: Whenever I feel like it.

Ride in our motor car or on neighbor's bicycle: Immediately after breakfast.

Lunch: As soon as possible.

Afternoon nap: 11 o'clock.

Rise and put the dog out: two o'clock.

Rise and have dinner: At dinner time.

Ride again in our motor car to park: Immediately after dinner.

Get up and come home: 9 or 10.

Retire immediately upon getting home.

Quite a difference, eh, Ed—or, is there?

Yours for many vacations,

LEW BRICATION.

Current Motor Truck Specifications

(This list comprises trucks distributed on a national basis)

MAKE AND MODEL	Tons Capacity	Price	ENGINE		Clutch Make	Gearset Make	REAR AXLE		TIRES	
			Make & Model	Bore & Stroke			Make & Model	Final Drive	Front	Rear
Ace.....30	11 1/2	\$2600	Mt-112	3 1/2x5	B-L	B-L	Ti-6500	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Ace.....40	12 1/2	3250	Mt-102	4 1/2x5 1/2	B-L	B-L	Ti-6400	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Ace.....60	13 1/2	3800	Mt-102	4 1/2x5 1/2	B-L	B-L	Ti-6500	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Acme.....20	11 1/2		Co-N	3 1/2x5	B&B	Cot.	Ti-6250	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Acme.....30	11 1/2		Co-N	3 1/2x5	B&B	Cot.	Ti-6352	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Acme.....40	11 1/2		Co-J	3 1/2x5	B&B	Cot.	Ti-6400	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Acme.....60	12 1/2		Co-K	4 1/2x5 1/2	B&B	Cot.	Ti-6500	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Acme.....90	13 1/2		Co-L	4 1/2x5 1/2	B&B	Cot.	Ti-6600	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Acme.....125	14 1/2		Co-B	5 1/2x6 1/2	B&B	Cot.	Ti-6700	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Amer. La France	3 1/2	4950	Own.	1 1/2x3	Own.	Own.	Own.	Own.	10x12	10x12
Armstrong.....20	11 1/2	5500	Own.	1 1/2x3	Own.	Own.	Own.	Own.	10x12	10x12
Armstrong.....HWC	20		Bu-CTU	3 1/2x5 1/2	Ful.	Ful.	Ti-6100	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Armstrong.....HWC	20		Bu-CTU	3 1/2x5 1/2	Ful.	Ful.	Ti-6100	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Armstrong.....KWC	20		Bu-CTU	3 1/2x5 1/2	Ful.	Ful.	Ti-6100	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Armstrong.....KWC	20		Bu-CTU	3 1/2x5 1/2	Ful.	Ful.	Ti-6100	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Atlas.....25	11 1/2	1195	Bu-WTU	3 1/2x5 1/2	B&B	Own.	Own.	Own.	10x12	10x12
Atlas.....40	11 1/2	1050	Bu-WTU	3 1/2x5 1/2	B&B	Own.	Own.	Own.	10x12	10x12
Atterbury.....20R	11 1/2	2175	Co-J	3 1/2x5	Ful.	Ful.	Ti-6400	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Atterbury.....22C	11 1/2	1375	Co-K	4 1/2x5 1/2	Ful.	Ful.	Ti-6500	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Atterbury.....22D	11 1/2	1375	Co-L	4 1/2x5 1/2	Ful.	Ful.	Ti-6600	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Atterbury.....8E	5 1/2	1975	Co-B	3 1/2x5	Ful.	Ful.	Ti-6700	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Autocar.....21	11 1/2	2200	Own.	1 1/2x3	Own.	Own.	Own.	Own.	10x12	10x12
Autocar.....27	12 1/2	3100	Own.	1 1/2x3	Own.	Own.	Own.	Own.	10x12	10x12
Autocar.....27 1/2	12 1/2	4200	Own.	1 1/2x3	Own.	Own.	Own.	Own.	10x12	10x12
Available.....JH	11 1/2	2150	Ho-O	3 1/2x5	B-L	B-L	Ti-6100	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Available.....H	11 1/2	3160	He-CU3	4 1/2x5 1/2	B-L	B-L	Ti-6500	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Available.....H	11 1/2	4175	He-MU3	4 1/2x5 1/2	B-L	B-L	Ti-6600	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Available.....H	11 1/2	5375	He-T3	5 1/2x6 1/2	B-L	B-L	Ti-6700	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Avery.....11 1/2	11 1/2		Own.	1 1/2x3	Own.	Own.	Own.	Own.	10x12	10x12
Bessemer.....G1	11 1/2	1450	Co-N	3 1/2x5	Ful.	Ful.	Ti-6400	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Bessemer.....H2	11 1/2	1995	Co-N	3 1/2x5	Ful.	Ful.	Ti-6500	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Bessemer.....J2	11 1/2	2895	Co-E2	4 1/2x5 1/2	B&B	B-L	LM-7250	DR.	3 1/2x13 1/2	3 1/2x13 1/2
Bessemer.....K2	11 1/2	3195	Co-C7	4 1/2x5 1/2	B&B	B-L	LM-7250	DR.	3 1/2x13 1/2	3 1/2x13 1/2
Bethlehem.....KN1	11 1/2	1385	Own.	1 1/2x3	Own.	Own.	Own.	Own.	10x12	10x12
Bethlehem.....KN2	11 1/2	2185	Own.	1 1/2x3	Own.	Own.	Own.	Own.	10x12	10x12
Bethlehem.....HN3	11 1/2	2985	Own.	1 1/2x3	Own.	Own.	Own.	Own.	10x12	10x12
Brookway.....E21	11 1/2		Wi-SU	3 1/2x5	B-L	B-L	Ti-6100	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Brookway.....S	11 1/2		Wi-SU	3 1/2x5	B-L	B-L	Ti-6100	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Brookway.....K	11 1/2		Co-K	4 1/2x5 1/2	B-L	B-L	Ti-6500	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Brookway.....R	11 1/2		Co-L	4 1/2x5 1/2	B-L	B-L	Ti-6600	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Brookway.....T	11 1/2		Co-B	5 1/2x6 1/2	B-L	B-L	Ti-6700	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Buick.....23-4-SD	3 1/2	945	Own.	1 1/2x3	Own.	Own.	Own.	Own.	10x12	10x12
Case.....TR	11 1/2		Own.	1 1/2x3	Own.	Own.	Own.	Own.	10x12	10x12
Chevrolet.....Sup	11 1/2	575	Own.	1 1/2x3	Own.	Own.	Own.	Own.	10x12	10x12
Clydesdale.....10	11 1/2		Co-N	3 1/2x5	B&B	B-L	Ti-5511	SB.	3 1/2x13 1/2	3 1/2x13 1/2
Clydesdale.....8	11 1/2		Co-K	4 1/2x5 1/2	B-L	B-L	Ti-6100	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Clydesdale.....6 1/2	11 1/2		Co-L	4 1/2x5 1/2	B-L	B-L	Ti-6200	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Clydesdale.....4 1/2	11 1/2		Co-B	5 1/2x6 1/2	B-L	B-L	Ti-6300	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Clydesdale.....2 1/2	11 1/2		Co-B	5 1/2x6 1/2	B-L	B-L	Ti-6400	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Commerce.....9 1/2	11 1/2		Co-N	3 1/2x5	Det.	Det.	Sa-D16	SB.	3 1/2x13 1/2	3 1/2x13 1/2
Commerce.....14	11 1/2		Co-J	3 1/2x5	Det.	Det.	Sa-D16	SB.	3 1/2x13 1/2	3 1/2x13 1/2
Commerce.....25	11 1/2		Co-K	4 1/2x5 1/2	B-L	B-L	Ti-6500	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Corbitt.....S1	11 1/2	125	HS-703	3 1/2x5	B-L	B-L	Sh-103	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Corbitt.....E1	11 1/2	118	Co-N	3 1/2x5	B-L	B-L	Sh-103	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Corbitt.....D1	11 1/2	213	Co-J	3 1/2x5	B-L	B-L	Sh-150	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Corbitt.....C2	11 1/2	210	Co-K	4 1/2x5 1/2	B-L	B-L	Sh-103	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Corbitt.....B2	11 1/2	300	Co-L	4 1/2x5 1/2	B-L	B-L	Sh-21	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Corbitt.....R3	11 1/2	3300	Co-K	4 1/2x5 1/2	B-L	B-L	Sh-21	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Corbitt.....A3-4	11 1/2	3300	Co-L	4 1/2x5 1/2	B-L	B-L	Sh-21	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Corbitt.....AA5	11 1/2	4600	Co-B	5 1/2x6 1/2	B-L	B-L	Sh-51	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Day-Elder.....AN1	11 1/2		Bu-WTU	3 1/2x5 1/2	B-L	B-L	Ti-6352	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Day-Elder.....BN2	11 1/2		Co-J	3 1/2x5	B-L	B-L	Ti-6100	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Day-Elder.....DN2	11 1/2		Co-K	4 1/2x5 1/2	B-L	B-L	Ti-6500	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Day-Elder.....CN3	11 1/2		Bu-HTU	3 1/2x5 1/2	B-L	B-L	Ti-6500	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Day-Elder.....FN4	11 1/2		Co-L	4 1/2x5 1/2	B-L	B-L	Ti-6600	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Day-Elder.....EN5-6	11 1/2		Bu-YTU	3 1/2x5 1/2	B-L	B-L	Ti-6700	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Dearborn.....E1	11 1/2	1600	Bu-Mu	3 1/2x5 1/2	Ful.	Ful.	Wi	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Dearborn.....F1	11 1/2	1980	Bu-WU	3 1/2x5 1/2	Ful.	Ful.	Wi	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Dearborn.....482	11 1/2	2390	Bu-WU	3 1/2x5 1/2	Ful.	Ful.	Wi	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Defiance.....G1	11 1/2	1525	Co-N	3 1/2x5	B&B	G-L	LM-7250	DR.	3 1/2x13 1/2	3 1/2x13 1/2
Denby.....31 1/2-1 1/4	11 1/2	1485	Co-N	3 1/2x5	Ful.	Ful.	CL-B300	SB.	3 1/2x13 1/2	3 1/2x13 1/2
Denby.....33 1/2	11 1/2	2375	Co-J	3 1/2x5	Ful.	Ful.	CL-D	SB.	3 1/2x13 1/2	3 1/2x13 1/2
Denby.....35 1/2	11 1/2	2975	Co-K	4 1/2x5 1/2	Ful.	Ful.	CL-D	SB.	3 1/2x13 1/2	3 1/2x13 1/2
Denby.....27 1/4	11 1/2	3695	Co-L	4 1/2x5 1/2	Ful.	Ful.	CL-D	SB.	3 1/2x13 1/2	3 1/2x13 1/2
Denby.....2105	11 1/2	4295	Co-B	5 1/2x6 1/2	Ful.	Ful.	CL-D	SB.	3 1/2x13 1/2	3 1/2x13 1/2
Denby.....2147	11 1/2	4945	Co-B	5 1/2x6 1/2	Ful.	Ful.	CL-D	SB.	3 1/2x13 1/2	3 1/2x13 1/2
Dependable.....C1 1/2-2	11 1/2	2350	Bu-CTU	3 1/2x5 1/2	Ful.	Ful.	Wi-900C	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Dependable.....EG21-3	11 1/2	2950	Bu-CTU	3 1/2x5 1/2	Ful.	Ful.	Wi-900C	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Diamond T.....031-1 1/4	11 1/2		Hi-703	3 1/2x5 1/2	Cov.	Cov.	Ti-6100	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Diamond T.....T1 1/2	11 1/2		Hi-703	3 1/2x5 1/2	Cov.	Cov.	Ti-6100	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Diamond T.....U2 1/2	11 1/2		Hi-1100	3 1/2x5 1/2	Cov.	Cov.	Ti-6500	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Diamond T.....K3 1/2	11 1/2		Hi-1500	3 1/2x5 1/2	Cov.	Cov.	Ti-6600	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Diamond T.....EL5	11 1/2		Hi-2000	3 1/2x5 1/2	Cov.	Cov.	Ti-6700	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Diamond T.....S5	11 1/2		Co-B	5 1/2x6 1/2	B-L	B-L	Ti-6700	WO.	3 1/2x13 1/2	3 1/2x13 1/2
Dodge Brothers.....3 1/2	11 1/2	750	Own.	1 1/2x3	Own.	Own.	Own.	Own.	10x12	10x12
Dorris.....K-4 1/2	11 1/2	3100	Own.	1 1/2x3	Own.	Own.	Own.	Own.	10x12	10x12
Dorris.....K-7 1/2	11 1/2	4400	Own.	1 1/2x3	Own.	Own.	Own.	Own.	10x12	10x12
Dort.....109 1/2	11 1/2	685	Ly-K	3 1/2x5	Det.	Own.	FL-105	SB.	3 1/2x13 1/2	3 1/2x13 1/2
Double Dr.....DFT3	11 1/2	4000	Bu-ETU	3 1/2x5 1/2	B&B	Own.	Own.	Own.	10x12	10x12
Duplex.....G1	11 1/2		Bu-WTU	3 1/2x5 1/2	B-L	B-L	Ti-5511	SB.	3 1/2x13 1/2	3 1/2x13 1/2

*—Make Optional
 †—Short wheelbase model
 ‡—6 cylinders
 §—All 4 cyl. engines unless otherwise specified
 ††—Truck Tractor
 †††—Front wheel drive
 b—price includes body or cab
 d—dual
 k—pneumatic tires optional at extra cost
 n—pneumatic tires standard

ENGINE:
 Bu—Buick
 Co—Continental
 Do—Dodge
 He—Hercules
 Hi—Hinkley
 HS—Herschell-Spillman
 Ly—Lycum
 Mi—Midwest
 Wa—Waukesha
 We—Weldley
 Wi—Wisconsin

CLUTCH & GEARSET
 B&B—Borg & Beck
 B-L—Brown-Lipe
 B&K—Baker
 Cam—Campbell
 Cot—Cotta
 Cov—Covet
 Del—Detrol
 Det—Detroit
 Ful—Fuller
 H-S—Hele-Shaw
 Hoo—Hoosier
 M&E—Merchant & Evans

Mec—Mechanics
 Mun—Munch
 T-L—Twin Disc
 War—Warner
 REAR AXLE:
 Am—American
 Cl—Clark
 Co—Columbia
 Du—Dunston
 En—Eaton
 Fl—Flint
 LM—L-M

Ru—Russell
 Sa—Salsbury
 Sh—Sheldon
 Ti—Timken
 To—Torbensen
 Wa—Walker
 Wi—Wisconsin
 Ch—Chain
 DR—Double Reduction
 IG—Internal Gear
 SB—Spiral Bevel
 SP—Straight Bevel
 WO—Worm

Current Motor Truck Specifications—Continued

(This list comprises trucks distributed on a national basis)

MAKE AND MODEL	Tons Capacity	Price	ENGINE		Clutch Make	Gearset Make	REAR AXLE		TIRES	
			Make & Model	Bore & Stroke			Make & Model	Final Drive	Front	Rear
Larrabee X2	1-1 1/2		Co-SR.1	3 1/2 x 4 1/2	B-L	B-L	Sa-1480	SB	34x5n	34x5n
Larrabee J4	1 1/2-2 1/2		Co-J4	3 1/2 x 5	B-L	B-L	Sh-1501	WO	34x3 1/2	34x5k
Larrabee K5	2 1/2-3 1/2		Co-L4	4 1/2 x 5 1/2	B-L	B-L	Sh-22	WO	36x4	36x8
Larrabee L4	3 1/2-4 1/2		Co-L4	4 1/2 x 5 1/2	B-L	B-L	Sh-31	WO	36x5	36x10
Maccar L2	1 1/2		Co-K4	4 1/2 x 5 1/2	B-L	B-L	Ti-6460	WO	36x4	36x6
Maccar HA	2		Co-K4	4 1/2 x 5 1/2	B-L	B-L	Ti-6560	WO	36x4	36x4d
Maccar H2	2		Co-L4	4 1/2 x 5 1/2	B-L	B-L	Ti-6560	WO	36x4	36x5d
Maccar M3	3		Co-L4	4 1/2 x 5 1/2	B-L	B-L	Ti-6666	WO	36x5	36x6d
Maccar G-6	5-6		Co-B2	4 1/2 x 6	B-L	B-L	Ti-6760	WO	36x6	40x6d
MacDonald O-3-5	3-5	\$5500b	Bu-WTU	3 1/2 x 5 1/2	B-L	B-L	**Own	IG	36x6	36x10
MacDonald A-7 1/2	7 1/2	8000b	Bu-YTU	4 1/2 x 6	B-L	B-L	**Own	IG	40x7	40x14
Mack AB 1 1/2	1 1/2	3000	Own	4x5	Own	Own	Ch	36x4	36x3 1/2	36x3 1/2
Mack AB 1 1/2	1 1/2	3450	Own	4x5	Own	Own	DR	36x4	36x3 1/2	36x3 1/2
Mack AB 2	2	3300	Own	4 1/2 x 5	Own	Own	Ch	36x4	36x4d	36x4d
Mack AB 2	2	3750	Own	4 1/2 x 5	Own	Own	DR	36x4	36x4d	36x4d
Mack AB 2 1/2	2 1/2	3400	Own	4 1/2 x 5	Own	Own	Ch	36x4	36x4d	36x4d
Mack AC 3 1/2	3 1/2	3850	Own	4 1/2 x 5	Own	Own	DR	36x4	36x4d	36x4d
Mack AC 3 1/2	3 1/2	4950	Own	5x6	Own	Own	Ch	36x5	40x5d	40x5d
Mack AC 3 1/2	3 1/2	5500	Own	5x6	Own	Own	Ch	36x6	40x6d	40x6d
Mack AC 3 1/2	3 1/2	5750	Own	5x6	Own	Own	Ch	36x6	40x12	40x12
Mack AC 3 1/2	3 1/2	6000	Own	5x6	Own	Own	Ch	36x7	36x7d	36x7d
Mack AC 3 1/2	3 1/2	3400	Own	4 1/2 x 5	Own	Own	Ch	36x4	36x4d	36x4d
Mack AC 7	7	4950	Own	5x6	Own	Own	Ch	36x5	40x5d	40x5d
Mack AC 10	10	5500	Own	5x6	Own	Own	Ch	36x6	40x6d	40x6d
Mack AC 13	13	5750	Own	5x6	Own	Own	Ch	36x6	40x12	40x12
Mack AC 15	15	6000	Own	5x6	Own	Own	Ch	36x7	40x7d	40x7d
Mason 1 1/2	1 1/2	1200	He	4x5	Hoo	War	FL	SB	34x5n	34x5n
Master 11 1/2	11 1/2		Bu-WTU	3 1/2 x 5 1/2	Ful	Ful	Ti-5511	SB	33x5n	33x5n
Master 21 1/2	21 1/2		Bu-OU	4 1/2 x 5 1/2	Ful	Ful	Ti-6460	WO	34x4	34x6
Master 41 1/2	41 1/2		Bu-ETU	4 1/2 x 5 1/2	Ful	Ful	Ti-6560	WO	34x4	36x8
Master 61 1/2	61 1/2		Bu-YTU	4 1/2 x 6	B-L	B-L	Ti-6666	WO	36x5	10x10
Master 61 1/2	61 1/2		Bu-YTU	4 1/2 x 6	B-L	B-L	Ti-6760	WO	36x5	10x12
Master 64 1/2-6	64 1/2-6		Bu-ATU	4 1/2 x 6 1/2	B-L	B-L	Ti-6760	WO	36x6	10x14
Maxwell 1 1/2	1 1/2	932	Own	3 1/2 x 4 1/2	Own	Own	Ti	WO	35x5n	35x5n
Menominee B 1	1	1650	Wi-SU	4x5	B&B	Det	Co-5200	SB	35x5n	35x5n
Menominee HT 1 1/2	1 1/2	2000	Wi-FAU	3 1/2 x 5	Ful	Del	Wi-800G	WO	34x3 1/2	36x5k
Menominee H 1 1/2	1 1/2	2175	Wi-EAU	4x5	Ful	Del	Wi-800H	WO	36x3 1/2	36x5k
Menominee D 2 1/2	2 1/2	2875	Wi-TAU	4x6	Ful	Del	Wi-800J	WO	36x4	36x8
Menominee 5 1/2	5 1/2	4850	Wi-RAU	4 1/2 x 6	B&B	Det	Ti-6760	WO	36x6	10x12
Moline 10 1/2	10 1/2	1695	Own	3 1/2 x 5	B&B	Own	To-A	IG	34x5n	36x6n
Moreland R.R. 1 1/2	1 1/2	1595	He-O	4x5	B-L	B-L	Ti-5512	WO	34x5n	34x5n
Moreland BX 1 1/2	1 1/2	1980	He-O	4x5	B-L	B-L	Ti-6461	WO	36x3 1/2	36x6
Moreland EX 2	2	2625	Co-K4	4 1/2 x 5 1/2	Own	Own	Ti-6461	WO	36x4	36x8
Moreland AX 3	3	3500	Co-L4	4 1/2 x 5 1/2	Own	Own	Ti-6560	WO	36x5	36x10
Moreland RX 5	5	4600	Co-B5	4 1/2 x 6	Own	Own	Ti-6666	WO	36x6	40x12
Nash 2018 1-1 1/2	1-1 1/2	1595	Own	3 1/2 x 5 1/2	B&B	Det	Cl-ID	IG	34x4	34x5
Nash 4017F 2-2 1/2	2-2 1/2	2750	Bu-HU	4 1/2 x 5 1/2	B&B	Own	Cl-ID	IG	34x4	34x7
Nash 3018 2-2 1/2	2-2 1/2	2150	Own	3 1/2 x 5 1/2	B&B	Det	Cl-ID	IG	34x4	34x7
Nash 5018 2-2 1/2	2-2 1/2	2250	Own	3 1/2 x 5 1/2	B&B	Det	Cl-ID	IG	34x4	34x7
Noble A7S 1	1	1395	Bu-WTU	3 1/2 x 5 1/2	Ful	Ful	Cl-300	SB	34x4 1/2	34x4 1/2
Noble A-21 1-1 1/2	1-1 1/2	1890	Bu-WTU	3 1/2 x 5 1/2	Ful	Ful	Sh-1501	WO	34x5	34x5
Noble B-31 1 1/2	1 1/2	3795	Bu-ETU	3 1/2 x 5 1/2	Ful	Ful	Sh-103	WO	36x4	36x7
Noble D-51 2 1/2	2 1/2	3150	Bu-ETU	3 1/2 x 5 1/2	Ful	Ful	Sh-21	WO	36x4	36x8
Noble E-71 3 1/2-5	3 1/2-5	3850	Bu-YTU	4 1/2 x 6	Ful	War	Sh-30	WO	36x5	36x10
Old Reliable B 2 1/2	2 1/2	3500	Wi-UAU	4 1/2 x 6	Ful	Ful	Sh-21	WO	34x4	36x8
Old Reliable C 3 1/2	3 1/2	4250	Wi-UAU	4 1/2 x 6	Ful	Ful	Sh-31	WO	36x5	36x12
Old Reliable K 7 1/2	7 1/2	5000	Wi-RAU	4 1/2 x 6	Own	Own	Sh-51	WO	36x6	40x12
Old Reliable D 5	5	6000	Wa-P	4 1/2 x 6 1/2	Own	Own	Co-OX2L	IG	35x5n	35x5n
Oldsmobile T 1	1	1095	Own	3 1/2 x 5 1/2	B&B	War	Co-OX2L	IG	35x5n	35x5n
Oneida B 1 1/2-2	1 1/2-2	2825	Hi-400	4x5 1/2	Ful	Ful	Wi-800J	WO	36x3 1/2	36x7
Oneida C 2 1/2	2 1/2	3200	Hi-400	4x5 1/2	Ful	Ful	Wi-900C	WO	36x4	36x7
Oneida D 3 1/2	3 1/2	4050	Hi-200	4 1/2 x 5 1/2	Ful	Ful	Ti-6652	WO	36x5	36x10
Overland 4D 1 1/2	1 1/2	425	Own	3 1/2 x 4	B&B	Own	Own	SB	30x3 1/2	30x3 1/2
Packard EC 2-3	2-3	3100	Own	4 1/2 x 5 1/2	Own	Own	Own	WO	36x4	36x7
Packard EX 2 1/2	2 1/2	3500	Own	4 1/2 x 5 1/2	Own	Own	Own	WO	36x5n	36x8n
Packard ED 3-5	3-5	4100	Own	4 1/2 x 5 1/2	Own	Own	Own	WO	36x6	36x8d
Packard EF 5-7	5-7	4500	Own	5x5 1/2	Own	Own	Own	WO	36x5n	35x5n
Patriot, Revere 1	1	1295	Co-N	3 1/2 x 5	B&B	Cov	Ti-6560	WO	34x4n	34x4n
Patriot, Lincoln 2	2	2400	Hi-400	4x5 1/2	Cov	Ful	Ti-6560	WO	34x4n	34x4n
Pat, Washington 3	3	3000	Hi-200	4 1/2 x 5 1/2	Cov	Cov	Wi-900	WO	36x5n	36x8n
Pierce Arrow XA 2	2	3300	Own	4x5 1/2	Own	Own	Own	WO	36x4	36x1d
Pierce Arrow WC 3	3	3500	Own	4 1/2 x 6 1/2	Own	Own	Own	WO	36x5	36x5d
Pierce Arrow WD 5	5	4700	Own	4 1/2 x 6 1/2	Own	Own	Own	WO	36x5	40x6d
Rainier R31 3/4	3/4		Co-N	3 1/2 x 5	B-L	B-L	Ti-6250	WO	35x5n	35x5n
Rainier R29 1 1/2	1 1/2		Co-N	3 1/2 x 5	B-L	B-L	Ti-6250	WO	34x3 1/2	34x4
Rainier R36 1 1/2	1 1/2		Co-J4	3 1/2 x 5	B-L	B-L	Ti-6460	WO	34x3 1/2	34x5
Rainier R28 2-2 1/2	2-2 1/2		Co-K4	4 1/2 x 5 1/2	B-L	B-L	Sh-103	WO	36x4	36x5
Rainier R20 2 1/2-3	2 1/2-3		Co-K4	4 1/2 x 5 1/2	B-L	B-L	Ti-6560	WO	36x4	36x8
Rainier R25 3 1/2-5	3 1/2-5		Co-L4	4 1/2 x 5 1/2	B-L	B-L	Ti-6666	WO	36x5	36x5d
Rainier R27 6	6		Co-B5	4 1/2 x 6	B-L	B-L	Ti-6760	WO	36x6	40x6d
Reo F 1 1/4	1 1/4	1185	Own	4 1/2 x 4 1/2	Own	Own	Own	SB	34x4 1/2	34x4 1/2
Republic 75 3/4	3/4	1395b	Ly-KB	3 1/2 x 5	Ful	Ful	To-750	IG	33x5n	33x5n
Republic 10E 1 1/2	1 1/2	1395	Co-N	3 1/2 x 5	Ful	Ful	To-1000	IG	34x5n	34x5n
Republic 11X 1 1/2	1 1/2	1795	Co-J4	3 1/2 x 5	Ful	Ful	To-CT2	IG	34x3 1/2	34x6
Republic 19W 2 1/2	2 1/2		Wa-FU	4x5 1/2	Ful	Ful	To-CT2	IG	36x4	36x7
Republic 19B 2 1/2	2 1/2	2195	Co-K4	4 1/2 x 5 1/2	Ful	Ful	To-CT2	IG	36x4	36x7
Republic 20 3 1/2	3 1/2	3095	Co-L4	4 1/2 x 5 1/2	Ful	Ful	To-E	IG	36x5	36x5d
Rowe CW 1 1/2	1 1/2	3000	Wi-CAU	3 1/2 x 5	B-L	B-L	Sh-1501	WO	36x5n	36x3 1/2
Rowe CDW 2 1/2	2 1/2	3300	Wi-EAU	4x5	B-L	B-L	Sh-21	WO	34x5	36x4d
Rowe GSW 3	3	4150	Wi-NU	4 1/2 x 5	B-L	B-L	Sh-31	WO	36x7	36x6d
Rowe HW 4	4	4500	Wi-UAU	4 1/2 x 6	B-L	B-L	Sh-51	WO	36x7	40x6d
Rowe FW 5	5	4850	Wi-UAU	4 1/2 x 6	B-L	B-L	Sh-51	WO	36x7	40x6d
Ruggles 15 3/4	3/4	895	HS	3 1/2 x 5	Own	Own	Co-5200	SB	32x4 1/2	32x4 1/2
Ruggles 20R 1 1/4	1 1/4	1375	Own	4x5	B-L	B-L	Wi-65	DR	34x5n	34x7
Ruggles 40 2	2	2095	Own	4x5	B-L	B-L	Wi-88E	DR	36x4	36x8

Current Motor Truck Specifications—Continued

(This list comprises trucks distributed on a national basis)

MAKE AND MODEL	Tons Capacity	ENGINE				REAR AXLE		TIRES		MAKE AND MODEL	Tons Capacity	ENGINE				REAR AXLE		TIRES	
		Price	Make & Model	Bore & Stroke	Clutch Make	Gearset Make	Make & Model	Final Drive	Front			Rear	Price	Make & Model	Bore & Stroke	Clutch Make	Gearset Make	Make & Model	Final Drive	Front	Rear
CANADIAN																			
Walter.....N2		\$3600†	Ow.....	4x5½	B-L.	B-L.	Ow....	DR.	36x4	36x8									
Walter.....S5		5100†	Ow.....	4½x6½	B-L.	War.	Ow....	DR.	36x6	40x6d									
White.....15 ¾		2400	Ow.....	3½x5½	Ow.	Ow.	Ow....	SP.	34½5n	34½5n									
White.....20 ½		3250	Ow.....	3½x5½	Ow.	Ow.	Ow....	DR.	36x4	36x7d									
White.....40 ¾		4200	Ow.....	4½x5½	Ow.	Ow.	Ow....	DR.	36x5	40x5d									
White.....45 ½		4500	Ow.....	4½x5½	Ow.	Ow.	Ow....	DR.	36x6	40x6d									
Wilcox.....AA 1		1900	Bu-CTU	3½x5½	B-L.	B-L.	Ru-3600	SP.	35x5	35x5									
Wilcox.....BB 1½		2550	Ow.....	4½x5	B&B	Ow.	Wa-2A.	DR.	36x6k	38x7k									
Wilcox.....CC 2½		3950	Bu-YTU	4½x6	M&E	Ow.	Wa-25A.	DR.	36x6k	40x8k									
Wilcox.....EE 3½		4350	Bu-ATU	4½x6½	M&E	Ow.	Wa-5A.	DR.	36x5	36x10									
Wilson.....C1		1350	He-O.....	4 x 5	B&B	Det.	Ti-6532	WO.	34x5n	34x5n									
Wilson.....F1½		2270†	Co-J4.....	3x4½	B&B	Cot.	Ti-6460	WO.	36x3½k	36x5k									
Wilson.....EA 2½		2825†	Co-K4.....	4½x5½	B&B	Cot.	Ti-6560	WO.	36x4k	36x7k									
Wilson.....G3½		3685†	Co-L4.....	4½x5½	B&B	Cot.	Ti-6660	WO.	36x5k	36x5dk									
Wilson.....H5		4520†	Co-B2.....	4½x6	B&B	Cot.	Ti-6752	WO.	36x6k	40x6dk									
Yellow Cab. M22	¾	1590	Co-V4.....	3½x5	B-L.	B-L.	Ti-6752	SB.	33x4½n	33x4½n									
Yellow Cab. M42	1½	1640	Co-V4.....	3½x5	B-L.	B-L.	Ti-6352	WO.	35x5n	35x5n									
Gotfredson.....20 ¾-1		\$1685	Bu-WTU	3½x5½	B-L.	B-L.	Ti-6250	WO.	34x5n	34x5n									
Gotfredson.....40 1½-2		2300	Bu-GTU	4x5½	B-L.	B-L.	Ti-6460	WO.	36x6n	38x7n									
Gotfredson.....50 2½		3000	Bu-ETU	4½x5½	B-L.	B-L.	Ti-6560	WO.	36x4	36x8									
Gotfredson.....80 4		3975	Bu-YTU	4½x6	B-L.	B-L.	Ti-6666	WO.	36x5	36x12									
Gotfredson.....100 5		4800	Bu-BTU	5x6½	B-L.	B-L.	Ti-6760	WO.	36x6	40x14									
Mapleleaf.....1½		3000	Hi-300	3½x5½	Ful.	Ful.	Sh-1501	WO.	34x5n	36x6n									
Mapleleaf.....AA 2		3600	Hi-400	4x5½	Ful.	Ful.	Sh-103	WO.	36x4	36x7									
Mapleleaf.....BB 3		4050	Hi-500	4½x5½	Ful.	Ful.	Sh-21	WO.	36x4	36x4d									
Mapleleaf.....CC 4		4800	Hi-200	1½x3½	Ful.	Ful.	Sh-31	WO.	36x5	36x5d									
Mapleleaf.....DD 5		5625	Hi-1600	1½x3½	Ful.	Ful.	Sh-51	WO.	36x6	36x6d									
National.....FA 1		.....	Wa-BUX	3½x5½	B-L.	B-L.	Ti-6352	WO.	35x5n	35x5n									
National.....GA 1½		.....	Wa-BUX	3½x5½	B-L.	B-L.	Ti-6460	WO.	34x4k	34x6k									
National.....HD 2½		.....	Wa-CU.	4½x5½	H-S.	B-L.	Ti-6560	WO.	36x5	36x10									
National.....NB 3½		.....	Wa-DU.	4½x5½	H-S.	B-L.	Ti-6666	WO.	36x6	40x12									
National.....OA 5		.....	Wa-EU.	5x6½	H-S.	B-L.	Ti-6760	WO.	36x7	40x14									
Veteran.....M 1½		2690	Bu-CTU	3½x5½	B&B	Cot.	Sh-1501	WO.	34x5n	34x5n									
Veteran.....P 2		3699	Bu-BTU	4½x5½	B&B	Cot.	Sh.....	WO.	36x4	36x7									
Veteran.....R 3		4200	Bu-HTU	4½x5½	B&B	Cot.	Sh-21	WO.	36x4	36x7									
Veteran.....S 4		5395	Bu-YTU	4½x6	B&B	Cot.	Sh-31	WO.	36x5	36x10									

Current Tractor Specifications

MAKE & MODEL	Drawbar-Pulley Rating	Recommended No. of 14 Ins. Plovs	ENGINE			Weight (Lbs.)	Traction Members, Dimensions, Diameter & Face (Ins.)	MAKE & MODEL	Drawbar-Pulley Rating	Recommended No. of 14 Ins. Plovs	Price	ENGINE			Weight (Lbs.)	Traction Members, Dimensions, Diameter & Face (Ins.)	MAKE & MODEL	Drawbar-Pulley Rating	Recommended No. of 14 Ins. Plovs	Price	ENGINE			Weight (Lbs.)	Traction Members, Dimensions, Diameter & Face (Ins.)			
			Make	No. of Cyls. Bore & Stroke								Make	No. of Cyls. Bore & Stroke								Make	No. of Cyls. Bore & Stroke						
Allis-Chalmers.....	6-12	1	\$295	LeR.	4-3 1/2 x 4 1/2	2500	48x 6	Gray.....DU	18-36	4	2150	Wau.	4-4 1/2 x 6 1/2	6200			Rumely Oil Pull	30-60	8-10		Ow.	2-10x12	26700	80x30				
Allis-Chalmers.....	15-25	3	1185	Mid.	4-4 1/2 x 5 1/2	4700	46x12	Gray.....EU	22-40	4	2385	Ow.	4-5 x 6 1/2	6900			Russell.....	15-30	3-4		Ch.	4-5 x 6 1/2	6000	56x14				
Allis-Chalmers.....	20-35	4	1885	Ow.	4-4 1/2 x 6 1/2	6150	50x12	Hart-Parr.....	20	2		Ow.	2-5 1/2 x 6 1/2	3973	46x10			Russell.....	20-40	4-5		Ch.	4-5 1/2 x 7	7900	60x16			
Allwork.....D	20-38	4-5	1695	Ow.	1-5 x 7	6500	48x14	Hart-Parr.....	30	3		Ow.	2-6 1/2 x 7	5220	52x10			Russell.....	30-60	8-10		Ow.	4-8 x 10	22550	84x22			
Allwork.....G	14-28	3	1495	Ow.	1-4 1/2 x 6	4800	48x12	Hart-Parr.....(Road)	30	3		Ow.	2-6 1/2 x 7	7560	52x18			Shaw-Enochs (Gr.)				LeR.	4-3 1/2 x 4 1/2	4400	48x 8			
Allwork.....C	16-30	3	1293	Ow.	1-5 x 6	5200	48x12	Heider.....D	9-16	2		Wau.	4-4 1/2 x 5 1/2	4000	54x 8			Topp-Stewart.....B	30-45	4		Wau.	4-4 1/2 x 6 1/2	7800	42x12			
Aultman-Taylor.....	15-30	3-4	1900	Ch.	1-5 x 6 1/2	7800	70x12	Heider.....C	12-20	3		Wau.	4-4 1/2 x 6 1/2	6000	57x10			Toro.....	6-10	2	\$675	LeR.	4-3 1/2 x 4 1/2	2900	41x 9			
Aultman-Taylor.....	22-45	4-6	3100	Ow.	1-5 1/2 x 8	12500	70x20	Heider.....M	5-10			LeR.	4-3 1/2 x 4 1/2	2800	46x 6			Townsend.....	10-20	2-3	800	Ow.	2-6 1/2 x 7	4500	48x12			
Aultman-Taylor.....	30-60	8-10	1400	Ow.	1-7 x 9	22500	90x24	Huber.....(Light 4)	12-25	3	985	Wau.	4-4 1/2 x 5 1/2	5000	60x10			Townsend.....	15-30	3-4	1350	Ow.	2-7 x 8	6500	56x18			
Avery.....	15-30	3-4	1095	Ow.	1-4 1/2 x 6	4750	50x12	Huber.....(Super 4)	15-30	3		Mid.	4-4 1/2 x 6	6000	60x10			Townsend.....	25-50	4-8	2500	Ow.	2-8 1/2 x 10	11500	60x24			
Avery.....	20-35	4-5		Ow.	1-4 1/2 x 7	7500	60x16	LaCrosse.....M	6-12	1		Ow.	2-4 x 6	3000	48x 7			Traylor.....	6-12	1	500	LeR.	4-3 1/2 x 4 1/2	1750	38x10			
Avery.....	25-50	5-6		Ow.	1-6 1/2 x 7	12500	69x20	LaCrosse.....H	12-24	3		Ow.	2-6 x 7	3800	56x10			Twin City.....	12-20	3	1200	Ow.	1-4 1/2 x 6	5000	50x12			
Avery.....	45-65	8-10		Ow.	1-7 1/2 x 8	22000	87 1/2 x 24	Lauson.....S	12-25	3		Mid.	4-4 1/2 x 5 1/2	4200			Twin City.....	20-35	5	2750	Ow.	4-5 1/2 x 6 1/2	9200	60x20				
Avery.....Tr. Runner				Ow.	1-4 x 5 1/2	5000	x 8 1/2	Lauson.....T	15-30	4		Bea.	4-4 1/2 x 5	6200			Twin City.....	40-65	8	4750	Ow.	4-7 1/2 x 9	24000	84x24				
Avery.....Road Racer				Ow.	6-3 x 4	4600	42x 6	Leader.....B	12-18	2		Ow.	2-6 1/2 x 6	4800	50x12			Uncle Sam.....C-20	12-20	2-3	990	Wei.	4-4 x 5 1/2	3000	46x12			
Bates (St. Mule) H	15-25	3		Mid.	4-4 1/2 x 5 1/2	3600	48x10	Leader.....N	16-32	3-1		Ch.	4-5 x 6	5800	52x12			Uncle Sam.....B-19	20-30	3-4	1535	Bea.	4-4 1/2 x 6	4650	50x12			
Bates (St. Mule) F	15-25	3		Mid.	4-4 1/2 x 5 1/2	4850	56x10	Leader.....GU	16-32	3-4		Ch.	4-5 x 6	6600	54x14			Uncle Sam.....D-21	20-30	3-4	1485	Bea.	4-4 1/2 x 6	4600	50x12			
Bates (St. Mule) G	25-35	4		Mid.	4-4 1/2 x 6	6500	x10	Lincoln.....A	15-30	3	1600	Bud.	4-4 1/2 x 6	5000	40x11			Wallis.....OK	15-27	3		Ow.	4-4 1/2 x 5 1/2	3630	48x12			
Bates (St. Mule) 40	30-40	4	1250	Stc.	1-4 1/2 x 6 1/2	5500	64x12	Little Giant.....B	16-22	4		Ow.	4-4 1/2 x 5	5200	54x14			Waterloo Boy.....N	12-25	3		Ow.	2-6 1/2 x 7	5869	52x12			
Bear.....	B 25-35	4		Ow.	1-4 1/2 x 6 1/2	5500	64x12	Little Giant.....A	26-35	6		Ow.	4-5 1/2 x 6	8700	66x20			Wetmore.....	12-25	3	1185	Wau.	4-4 x 5 1/2	2900	46x10			
Best.....	30-40	4		Ow.	1-4 1/2 x 6 1/2	8100	68x11 1/2	Lombard.....	100	12-16		Ow.	6-5 1/2 x 7	19000	x12			Wisconsin.....	16-30	3-4	1750	Ch.	4-5 x 6 1/2	5600	52x12			
Best.....	60-100	9		Ow.	1-6 1/2 x 8 1/2	18580	89x20	London.....	12-25	3		Mid.	1-4 1/2 x 5 1/2	48x12			Wisconsin.....	22-40	4-5	2250	Ch.	4-5 1/2 x 7	7500	52x12				
Bryan.....Steam	15-30	3	2500	Ow.	2-4 x 5	5500	52x12	McCork-Deering.....	10-20	2	785	Ow.	4-4 1/2 x 5	3700	42x12			Yuba (Ball Tread).....	15-25	3	2750	Wis.	4-4 1/2 x 6	5750	36x12			
Case.....	12-20	3	1095	Ow.	1-4 1/2 x 5	4230	42x12	McCork-Deering.....	15-30	3	1250	Ow.	4-4 1/2 x 6	5750	50x12			Yuba (Ball Tread).....	25-40	6	4250	Wis.	4-5 1/2 x 7	10130	48x17 1/2			
Case.....	15-27	3-4	1350	Ow.	1-4 1/2 x 6	6600	52x14	Minneapolis.....	12-25	3		Ow.	4-4 1/2 x 7	6600	56x12													
Case.....	22-40	4-5	2650	Ow.	1-5 1/2 x 6 1/2	10700	56x16	Minneapolis.....	17-30	3-4		Ow.	4-4 1/2 x 7	6400	54x12													
Case.....	40-72	8-10	1900	Ow.	1-7 x 8	21200	72x20	Minneapolis.....	22-44	4-5		Ow.	4-6 x 7	12410	62x20													
Caterpillar.....2 Ton	15-30	3	1975	Ow.	1-4 x 5 1/2	4000		Minneapolis.....	35-70	8-10		Ow.	4-7 1/2 x 9	22500	85x30													
Caterpillar.....5 Ton	25-40	4	3975	Ow.	1-4 1/2 x 6	9400		Moline (Un.).....D3	9-8	2-3	725	Ow.	1-3 1/2 x 5	4103	52x 8			Aro.....F	3-6	1	\$3850	Ow.	1-4 1/2 x 5	1000	30x 4			
Caterpillar.....10 Ton	40-60	6	6050	Ow.	1-6 1/2 x 7	19500		Moline (Ore.).....D	9-8	2-3	725	Ow.	1-3 1/2 x 5	3893	44x 8			Beeman.....Jr.	1 1/2-4	1	180	B.&S.	1-2 1/2 x 2 1/2	190	16x 3			
Cletrac.....F	9-16	2	745	Ow.	1-3 1/2 x 4 1/2	1930	42x 5 1/2	Monarch.....C	20-30	4	3800	Bea.	4-4 1/2 x 6	8700	66x12			Beeman.....K	1 1/2-4	1	265	Ow.	1-3 1/4 x 4 1/4	550	25x 3 1/2			
Cletrac.....W	12-20	2	1345	Ow.	1-4 x 5 1/2	3455	48x 8	Monarch.....E	25-40	4	4350	Bea.	4-4 1/2 x 6	12000	67x12			Bolens.....	1	180	B.&S.	1-2 1/2 x 2 1/2	190	10x 3				
Eagle.....F	12-22	3		Ow.	2-7 x 8	5850	48x12	Monarch.....D	35-60	6	5750	Bea.	6-4 1/2 x 6	15000	89x12			Centaur.....1923	2 1/2-5	1	345	N-W.	1-4 1/4 x 4 1/4	700	28x 4			
Eagle.....H	16-30	4		Ow.	2-8 x 8	9100	48x12	Nichols-Shepherd.....	20-42	4-6	2600	Ow.	2-9x10	13500	64x20			Do-It-All.....(Jack)	2 1/2-5	1	395	Ow.	1-3 1/2 x 3 1/2	750				
E-B.....A	12-20	3		Ow.	1-4 1/2 x 5	4550	54x12	Nichols-Shepherd.....	25-50	6-8	3320	Ow.	2-9x12	20500	69x28			Do-It-All.....(Baby)	2 1/2-5	1	495	Ow.	1-4 1/2 x 5	1200	26x 2 1/2			
E-B.....Q	12-20	3		Ow.	1-4 1/2 x 5	6500	60x12	Nichols-Shepherd.....	35-70	8-12	4030	Ow.	2-10x14	30000	73x32			Do-It-All.....(Twin 12)	4-15	1	495	Ow.	2-3 1/2 x 3 1/2	800	32x 4			
E-B.....	16-32	4		Ow.	1-5 1/2 x 7	9400	72x16	Pioneer.....	16-36	4		Ow.	4-5 1/2 x 6	6500	60x18			Kinkade.....	1 1/2-3	1	190	Ow.	1-3 x 3	180	22x 5 1/2			
Fagel.....	10-12	2	1175	Lye.	4-3 1/2 x 5	3600	48x 8 1/2	Pioneer.....C	16-36	4		Ow.	4-7 x 8	24000	96x12			M.B.M. Red.....E	1-4 1/2	1	250	Ow.	1-3 1/2 x 4	410	20 x 3			
Fordson.....	-18	2	395	Ow.	1-4 x 5	2543	42x12	Rumely Oil Pull.....	12-20	3		Ow.	2-6 x 8	6682	51x21			Motor Maculivator.....	2	1	375	Ow.	2-2 1/2 x 4	750	32x 4			
Frick.....A	12-20	2	1000	Erd.	4-4 x 6	5800	60x10	Rumely Oil Pull.....	16-30	4		Ow.	2-7 x 8 1/2	9600	56x16			Utilitor.....501	2 1/2-4	1	295	Ow.	1-3 1/4 x 4 1/4	750	24 1/2 x 4			
Frick.....C	15-28	3	1600	Bea.	4-4 1/2 x 6	6730	60x12	Rumely Oil Pull.....	20-40	6		Ow.	2-8 x 10	12820	64x20			Utilitor.....501A	2 1/2-4	1	340	Ow.	1-3 1/4 x 4 1/4	925	24 1/2 x 4			

Current Passenger Car Specifications

(This list comprises cars distributed on a national basis)

PRICES						Wheel Base (Ins.)	Tire Size (Ins.)	NAME AND MODEL	ENGINE				ELECTRICAL SYSTEM		Clutch: Type and Make	Gearset Make	Universal: Type and Make	REAR AXLE			
OPEN MODELS			CLOSED MODELS						Make	No. of Cyls. Bore and Stroke	Horse Power Rating (N.A.A.C.)	Carburetor Make	Generator and Starter Make	Ignition Make				Type and Make	Type and Make	Gear Ratio	
\$1950c	\$1785	\$1850	\$1895c	\$2250	\$2485	127	33x4 1/2	American.....D-66	H-S.	6-3 1/2x5	29.40	Strom.	G-D.	A-K.	s-p	B&B.	B & B.	m Hartford.	F Salis..	4.50	
	1195		1395c		1495	114	32x4	Anderson.....41	Cont.	6-3 1/2x4 1/2	23.44	Zenith.	West.	West.	s-p	B&B.	Durston.	f Universal.	1/2 F Salis..	4.75	
1495	1495	1595	1785b	1995c		122	32x4	Anderson.....Series 50	Cont.	6-3 1/2x4 1/2	27.31	Rayfield.	Remy.	Remy.	s-p	B&B.	Durston.	f Universal.	3/4 F Salis..	4.62	
			1915c			132	33x4	Anderson.....Series 50	Cont.	6-3 1/2x4 1/2	27.34	Rayfield.	Remy.	Remy.	s-p	B&B.	Durston.	f Universal.	3/4 F Salis..	4.62	
	1535				2290	120	32x4	Apperson.....6	Own.	6-3 1/2x4 1/2	23.44	Strom.	Remy.	Remy.	s-p	Rockford.	Mech.	m Thieme.	1/2 F Col.	5.10	
	2800	2900			3750	130	33x5	Apperson.....8-23-S	Own.	8-3 1/2x5	33.80	Johnson.	Bijur.	Remy.	m-d	Own.	Own.	m Thieme.	1/2 F Own.	4.25	
	1165		1275d		1515	114	31x4	Auburn.....6-43	Cont.	6-3 1/2x4 1/2	23.44	Strom.	Remy.	Remy.	s-p	B&B.	Warner.	m Detroit.	1/2 F Col.	4.60	
	1725		1985d		2015	122	32x4 1/2	Auburn.....6-63	Own.	6-3 1/2x5	25.35	Strom.	Remy.	Remy.	s-p	B&B.	Warner.	m Thieme.	1/2 F Col.	4.60	
	1395		1450d		1850	118	32x4	Barley.....	Cont.	6-3 1/2x4 1/2	23.44	Strom.	Deleo.	Deleo.	s-p	B&B.	Fuller.	f M&E.	1/2 F Col.	5.10	
	865	885	725g	1025	1175	109	31x4	Buick 1923-34-5-6-7-8-39	Own.	4-3 1/2x4 1/2	18.23	Marvel.	Deleo.	Deleo.	m-d	Own.	Own.	m Own.	3/4 F Own.	4.66	
1175	1165	975g	1935	1955		118	32x4	Buick 1923-41-4-5-47	Own.	6-3 1/2x4 1/2	27.31	Marvel.	Deleo.	Deleo.	m-d	Own.	Own.	m Own.	F Own.	4.10	
		1435	1625a	1895	2195	121	33x4 1/2	*Buick 1923 48-9-50-4-55	Own.	6-3 1/2x4 1/2	27.31	Marvel.	Deleo.	Deleo.	m-d	Own.	Own.	m Own.	F Own.	4.70	
2885	2885	2885	3075c	3950	4300s	132	33x5	Cadillac.....61	Own.	8-3 1/2x5 1/2	31.25	Own.	Deleo.	Deleo.	m-d	Own.	Own.	m Spicer.	F Tim.	Opt.	
				3751	3991																
1750	1790		2230d		2575	122	32x4 1/2	Case.....X	Cont.	6-3 1/2x4 1/2	27.34	Rayfield.	Deleo.	Deleo.	m-d	Own.	Own.	f Sneed.	1/2 F Col.	5.09	
			199j	1950c	2480	129	31x4 1/2	Case.....W	Cont.	6-3 1/2x4 1/2	31.54	Rayfield.	Deleo.	Deleo.	m-d	Own.	Own.	f Arvac.	1/2 F Col.	4.69	
1185	1185		1445c	1595	1585	117	32x4	Chalmers.....1923	Own.	6-3 1/2x4 1/2	25.35	Strom.	A-L.	Remy.	m-d	Own.	Own.	m Hardy.	1/2 F Adams	5.13	
						122	32x4	Chalmers.....1923	Own.	6-3 1/2x4 1/2	25.35	Strom.	A-L.	Remy.	m-d	Own.	Own.	m Hardy.	1/2 F Adams	5.13	
1595	1485	1635	1785c		1785	123	32x4	Chandler.....Six	Own.	6-3 1/2x5	29.40	Strom.	Bosch.	Bosch.	s-p	B&B.	Own.	f Own.	F Own.	4.45	
					2270																
510	525	425g		680	880	103	30x3 1/2	Chevrolet.....Superior	Own.	4-3 1/2x4	21.76	Zenith.	Remy.	Remy.	e	Own.	Own.	m Own.	1/2 F Own.	3.77	
				850																	
1085	995		1095d	1195	1295	112 1/2	31x4	Cleveland.....42	Own.	6-3 1/2x4 1/2	22.50	Strom.	Bosch.	Bosch.	s-p	B&B.	Own.	m Mech.	1/2 F Own.	4.90	
			1260d	1395p	1595p																
	2175	2175		2753c	3075	127 1/2	33x5	Cole.....Master	North.	8-3 1/2x4 1/2	39.20	Johnson.	Deleo.	Deleo.	m-d	North.	North.	m Spicer.	F Col.	4.70	
	1475			1995	1995	115	32x4	Columbia.....Big Six	Cont.	6-3 1/2x4 1/2	27.34	Strom.	A-L.	A-K.	s-p	B&B.	Durston.	m Spicer.	1/2 F Tim.	4.75	
955c	1135		1395d	1295	1465	115	31x4	Columbia.....Light Six	Cont.	6-3 1/2x4 1/2	23.44	Strom.	A-L.	A-L.	s-p	B&B.	Durston.	m Spicer.	1/2 F Tim.	5.10	
	1095				1635																
1195	1235		1195b	1875j	2055	116	32x4	Courier.....	Falls.	6-3 1/2x4 1/2	23.44	Strom.	West.	A-K.	s-p	B&B.	Muncie.	f Flexite.	3/4 F Col.	5.10	
			1565c		2055																
	3100	3110		3500c	4500	138	33x4 1/2	Crawford.....23-6-70	Cont.	6-3 1/2x5 1/2	31.54	Zenith.	West.	Bosch.	m-d	B-L.	B-L.	m Spicer.	1/2 F Tim.		
					4500	138	33x5	Crawford-Dagmar.....6-70	Cont.	6-3 1/2x5 1/2	31.54	Zenith.	West.	Bosch.	m-d	B-L.	B-L.	m Spicer.	1/2 F Tim.		
	5390	6300		7650		142	33x5	Cunningham.....V4	Own.	8-3 1/2x5	45.00	Strom.	Deleo.	Deleo.	m-d	Own.	Own.	f Sneed.	F Tim.	4.23	
4350	4350c	4350	4350c	5300	5350	132	33x5	Daniels.....23-38	Own.	8-3 1/2x5 1/2	39.20	Zenith.	Deleo.	Deleo.	m-d	Own.	Own.	m Spicer.	F Tim.	4.23	
				5900s	5900s																
1295	1495		1495c		1595	115	31x4	Davis.....71	Cont.	6-3 1/2x4 1/2	23.44	Strom.	Deleo.	Deleo.	s-p	B&B.	Warner.	m M&E.	1/2 F Tim.	5.10	
1395	1595		1695d	2095		120	32x4 1/2	Davis.....63	Cont.	6-3 1/2x4 1/2	27.34	Strom.	Deleo.	Deleo.	s-p	B&B.	Warner.	m Peters.	1/2 F Tim.	5.15	
85j	880		980	1440	1195	114	32x4	Dodge Brothers.....	Own.	4-3 1/2x4 1/2	24.03	Stewart.	N.E.	N.E.	m-d	Own.	Own.	m Own.	1/2 F Own.	1.16	
				1195																	
	950	950	4150c	4985	515j	5800	136	33x5	Dorris.....6-80	Own.	6-4 x5	38.40	Strom.	West.	Bosch.	m-d	Own.	Warner.	m Spicer.	1/2 F Tim.	4.23
	885		995c	1240	135j	108	31x4	Dort.....23-18	Lyc.	4-3 1/2x5	19.60	Carter.	Bosch.	Comm.	m-d	Detlaiff.	Own.	m Mech.	1/2 F Flint.	1.66	
1010	1025		1135c	1355	1485	115	31x4	Dort.....25-20	Falls.	6-3 1/2x4 1/2	23.44	Carter.	Bosch.	Bosch.	m-d	Detlaiff.	Own.	m Mech.	1/2 F Flint.	4.66	
5750	5590	5900	5750c		7500	134	33x5	Duesenberg.....Straight 8	Own.	8-2 1/2x5	26.45	Strom.	Deleo.	Deleo.	s-p	Own.	Own.	f Climax.	1/2 F Own.	4.45	
860	860		1065d	1365	1365	109	31x4	Durant.....A-22	Cont.	4-3 1/2x4 1/2	24.03	Till.	A-L.	A-L.	s-p	Own.	Warner.	m Spicer.	1/2 F Adams	4.33	
				1165d																	
1600	1650		2250	2100		123 1/2	32x4 1/2	Durant.....B-22	Anst.	6-3 1/2x4 1/2	25.35	Rayfield.	A-L.	A-L.	s-p	Ansted.	Warner.	m Spicer.	1/2 F Tim.	5.15	
1485	1095		1275d	1395c	1595	112	32x4	Earl.....40	Own.	4-3 1/2x5 1/2	18.91	Soe.	A-L.	Comm.	s-p	B&B.	Own.	f Own.	1/2 F Own.	4.87	
	995		1135		1125	112	31x4	Elcar.....4-40	Lyc.	4-3 1/2x5	21.03	Strom.	Deleo.	Deleo.	s-p	B&B.	Warner.	m Peters.	1/2 F Salis.	4.50	
1395	1395		1595d	1975	1995	118	32x4	Elcar.....6-60	Cont.	6-3 1/2x4 1/2	27.34	Strom.	Deleo.	Deleo.	m-d	Warner.	Warner.	m Spicer.	1/2 F Salis.	4.50	
		1045		1145	1115	108 1/2	32x4	Essex.....	Own.	4-3 1/2x5	18.23	Own.	Bosch.	Bosch.	m-d	Own.	Own.	m Spicer.	1/2 F Own.	4.66	
	1195		1195	1895c	1985	120	32x4 1/2	Flint.....	Cont.	6-3 1/2x5	27.34	Strom.	A-L.	A-L.	s-p	Own.	Warner.	m Spicer.	1/2 F Adams		
260j	298h	235g		530	595	100	30x3 1/2	Ford.....T	Own.	4-3 1/2x4	22.50	Own.	Own.	Own.	m-d	Own.	Own.	m Own.	1/2 F Own.	3.63	
				725																	
2975	2975		3975	3975	3975	132	32x4 1/2	Fox.....Air-Cooled	Own.	6-3 1/2x5	27.34	Zenith.	West.	Scintilla.	m-d	B-L.	B-L.	m Spicer.	1/2 F Tim.	4.90	
	1950		2750c	2250	2250	115	32x4	Franklin.....10	Own.	6-3 1/2x4	25.35	Own.	A-K.	A-K.	s-p	B&B.	Own.	m Spicer.	1/2 F Own.	4.73	
			2850j	2850	2850																
995	995		1145c	1445	1445	112	32x4	Gardner.....Series 5	Own.	4-3 1/2x5	21.76	Zenith.	West.	West.	s-p	B&B.	Mech.	m Peters.	1/2 F Flint.	4.80	
490	520		750	750	750	100	30x3 1/2	Gray.....	Own.	4-3 1/2x4	21.03	Soe.	West.	West.	s-p	Own.	Own.	m Mech.	1/2 F Tim.	3.90	
				785																	
2250j	2250		2850j	2600		120	32x4 1/2	H.C.S.....Series 4	Weid.	4-3 1/2x5 1/2	22.50	Strom.	Deleo.	Deleo.	m-d	B-L.	B-L.	m Spicer.	1/2 F Own.	4.63	
	2050					126	32x4 1/2	H. C. S.....Series 6	Midw.	6-3 1/2x5	29.40	Strom.	Deleo.	Deleo.	m-d	B-L.	B-L.	m Spicer.	1/2 F Own.	4.38	
1350			1350d	1750		115	32x4 1/2	Handley.....6-40	Falls.	6-3 1/2x4											

The sign that sells WEED TIRE CHAINS when it rains

"I am selling more Weed Chains on rainy days by sticking the attractive 'We use 'em ourselves' sign on my window and on the windshield of my car that stands in front of my store" was the valued advice we received last month from a wide-awake dealer.

Use this idea yourself, Mr. Dealer, and you will increase your sales of Weed Chains *this summer*. Copies of the sign will be promptly mailed on request.

"Ask 'Em to Buy" Weed Chains, and "Use 'Em Yourself to Sell 'Em" *this summer*.

American Chain Co., Inc.
Bridgeport, Connecticut

In Canada:
DOMINION CHAIN COMPANY, LIMITED
Niagara Falls, Ont.

District Sales Offices: Boston Chicago
New York Philadelphia
Pittsburgh San Francisco

Manufacturers of Chains
for all purposes



When it rains-Use
WEED TIRE CHAINS
We use 'em ourselves

Current Passenger Car Specifications

(This list comprises cars distributed on a national basis)

PRICES						Wheel Base (Ins.)	Tire Size (Ins.)	NAME AND MODEL	ENGINE			ELECTRICAL SYSTEM		Clutch: Type and Make	Gearset Make	Universal: Type and Make	REAR AXLE			
OPEN MODELS			CLOSED MODELS						Make	No. of Cyls. Bore and Stroke	Horse Power Rating (N.A.A.C.)	Carburetor Make	Generator and Starter Make				Ignition Make	Type and Make	Gear	
2-3 Pass.	4-5 Pass.	6-7 Pass.	2-3 Pass.	4-5 Pass.	6-7 Pass.															
\$2385	\$1885	\$2385	\$2385c	(3375	3075	124	32x4 1/2	Kissel.....45	Own.	6-3 1/2x5 1/2	26.38	Strom.	Remy.	Remy.	m-d Warner.	Warner.	m Spicer.....	F Own.....	3.32
5000	5000	5000	2145d	2345	2975	132	33x5	LaFayette.....	Own.	8-3 1/2x5 1/2	33.80	Johnson.	Deleo.	Deleo.	m-d Own.	Own.	m Own.	F Own.....	4.30	
1795	1795	1795	2095	2195	2645	123	32x4 1/2	Lexington.....	Anst.	6-3 1/2x4 1/2	25.35	Rayfield.	G-D.	Conn.	m-d Own.	Warner.	f Snead.....	F Salis.....	5.10	
1575	1395	.....	1575	2085	2245	117	32x4	Liberty.....10-D	Own.	6-3 1/2x5	23.44	Strom.	Wagner	Wagner	e-p B&B.	Detroit.	m Spicer.....	1/2 F Tim.....	4.80
3800	3800c	3800	4600c	4400	4900	136	33x5	Lincoln.....	Own.	8-3 3/8x5	36.45	Strom.	Deleo.	Deleo.	m-d Own.	Own.	m Spicer.....	F Tim.....	4.80	
8900	9500c	9600	.....	11750	11600	142	35x5	Locomobile.....Series 8	Own.	6-4 1/2x5 1/2	48.60	Ball&B.	West.	Deleo.	m-d Own.	Own.	m Own.....	F Own.....	5.60
3385	(3185	(3185	4685f	4385	4385	136	32x4 1/2	Marmon.....34	Own.	6-3 1/2x5 1/2	33.75	Strom.	Deleo.	Deleo.	m-d Own.	Own.	m Spicer.....	3/4 F Own.....	4.10	
885	885	.....	975b	985	1235	109	31x4	Maxwell.....	Own.	4-3 3/4x4 1/2	21.03	Stewart.	Remy.	Remy.	e Own.	Own.	f Own.....	1/2 F Own.....	4.00
5400	4550	5700	5090c	6720	6810	140	33x5	McFarlan.....1923	Own.	6-4 1/2x6	48.60	Rayfield.	West.	West.	m-d M&E.	B-L.	m Peters.....	F Tim.....	3.70	
3950b	3950c	3950c	3750c	4700	5000	132	32x4 1/2	Mercur.....Series 5	Own.	4-3 3/4x6 1/2	22.50	Ball&B.	West.	Eisem.	m-d Own.	Own.	m Spicer.....	F Own.....	3.85	
1695	1695	3750c	3750c	4700	5000	132	32x4 1/2	Mercur.....6	Own.	6-3 1/2x5	33.75	Strom.	West.	Eisem.	m-d Own.	Own.	m Spicer.....	3/4 F Own.....	3.70	
1295	1295	.....	1495d	1585c	1695	115	31x4	Merit.....	Cont.	6-3 3/4x4 1/2	23.41	Strom.	Deleo.	Deleo.	e-p B&B.	Muncie.	f Snead.....	F Col.....	4.60
.....	.....	.....	1785f	1895	1895	115	31x4	Moon.....6-40	Cont.	6-3 3/4x4 1/2	23.41	Strom.	Deleo.	Deleo.	e-p B&B.	Warner.	m Spicer.....	1/2 F Tim.....	5.10
.....	.....	.....	1785f	1895	1895	115	31x4	Moon.....6-58	Cont.	6-3 3/4x4 1/2	27.34	Strom.	Deleo.	Deleo.	e-p B&B.	B-L.	m Spicer.....	3/4 F Tim.....	5.00
1240	1240	.....	1645c	2090	2190	121	32x4 1/2	Nash.....691-3-6-7	Own.	6-3 1/2x5	25.35	Marvel.	Deleo.	Deleo.	e-p B&B.	Own.	m Own.....	1/2 F Own.....	4.30
915	935	.....	1195d	1445	1445	112	33x4	Nash.....692-4-5-8	Own.	6-3 1/2x5	25.35	Marvel.	Deleo.	Deleo.	e-p B&B.	Own.	m Own.....	1/2 F Own.....	4.30
.....	.....	.....	1275	3285	3285	130	32x4 1/2	Nash.....41-8	Own.	6-3 1/2x5	18.23	Marvel.	Deleo.	Deleo.	e-p B&B.	Own.	m Own.....	1/2 F Own.....	4.30
2475	2475c	(2375	2485d	.....	3250	130	32x4 1/2	National.....BB	Own.	6-3 1/2x5 1/2	29.40	Rayfield.	West.	Deleo.	e-p B&B.	B-L.	m Universal.	F Col.....	4.00
2500	2500c	2600c	.....	3725	3500	128	33x5	Noma.....4C	Cont.	6-3 3/4x4 1/2	27.34	Zenith.	Deleo.	Deleo.	e-p B&B.	Detroit.	m Spicer.....	1/2 F Tim.....	4.45
975	995	795g	(1165c	1185	1545	115	32x4	Oakland.....6-44	Own.	6-2 1/2x4 1/2	18.99	Marvel.	Remy.	Remy.	e Own.	Muncie.	m Mech.....	F Own.....	4.70	
975	975	.....	1145a	1445	1445	115	32x4	Oldsmobile.....43 A	Own.	4-3 1/2x5 1/2	21.80	Zenith.	Deleo.	Deleo.	e-p B&B.	Muncie.	m Own.....	3/4 F Own.....	4.70
.....	.....	.....	1075c	1195	1375f	115	32x4	Oldsmobile.....46	Own.	8-2 1/2x4 1/2	26.45	Ball&B.	Deleo.	Deleo.	e Own.	Muncie.	m Spicer.....	F Own.....	4.30
1625p	1375	.....	1875c	1875	2025	115	32x4	Oldsmobile.....47	Own.	8-2 1/2x4 1/2	26.45	Johnson.	Deleo.	Deleo.	e-p B&B.	Muncie.	m Spicer.....	3/4 F Own.....	4.30
525	525	.....	425k	795	860	100	30x3 1/2	Overland.....91	Own.	4-3 3/4x4	18.23	Till.	A-L.	A-L.	e-p B&B.	Own.	m Own.....	1/2 F Own.....	4.30
.....	750	.....	425k	795	860	100	30x3 1/2	Overland.....92	Own.	4-3 3/4x4	18.23	Till.	A-L.	A-L.	e-p B&B.	Own.	m Own.....	1/2 F Own.....	4.30
2485	2485	.....	2650c	3175c	3275	126	33x4 1/2	Packard.....126	Own.	6-3 1/2x5	27.34	Own.	A-K.	Deleo.	m-d Own.	Own.	m Spicer.....	1/2 F Own.....	1.60
3850	3650	.....	4500c	4725	4700f	136	33x5	Packard.....133	Own.	6-3 1/2x5	27.34	Own.	A-K.	Deleo.	m-d Own.	Own.	m Spicer.....	1/2 F Own.....	1.60
2695	2450	2450	.....	4900f	4950f	143	33x5	Packard "Eight".....136	Own.	8-3 1/2x5	36.45	Own.	Dyneto.	Deleo.	m-d Own.	Own.	m Spicer.....	1/2 F Own.....	4.70
.....	.....	.....	3235	3235	3435f	131	33x4 1/2	Packard "Eight".....143	Own.	8-3 1/2x5	36.45	Own.	Dyneto.	Deleo.	m-d Own.	Own.	m Spicer.....	1/2 F Own.....	4.70
1550	1390	1425	1465d	2395d	2395	120	32x4 1/2	Paige.....6-70	Cont.	6-3 1/2x5	33.75	Rayfield.	Remy.	A-K.	m-d Long.	Warner.	m Mech.....	1/2 F Tim.....	4.00	
3300	2990	2990	3300	3400	4090	128	33x5	Patterson.....23-6-52	Cont.	6-3 1/2x4 1/2	27.34	Strom.	Deleo.	Deleo.	e-p B&B.	Durston.	m Hartford.	1/2 F Salis.....	4.80	
5250	5250	5250	6800	6900	6800f	138	33x5	Peerless.....23	Own.	8-3 1/2x5	33.80	Ball&B.	Deleo.	Deleo.	m-d Own.	Own.	m Spicer.....	1/2 F Tim.....	4.30	
.....	1695	1745	2445	2495	2495	126	32x4 1/2	Pierce-Arrow.....	Own.	6-4 x5 1/2	38.40	Own.	Deleo.	Deleo.	m-d Own.	Own.	m Spicer.....	1/2 F Own.....	4.30	
2535	2535	2585d	2635d	3385	3585	126 1/2	32x4 1/2	Pilot.....6-50	H-S.	6-3 1/2x5	25.35	Till.	Wag.	Wag.	e-p Hoosier.	Muncie.	m Blood.....	3/4 F Col.....	4.30	
1095	1095	.....	1750	1825	1825	117	32x4	Premier.....6-D	Own.	6-3 1/2x5 1/2	27.34	Strom.	Deleo.	Deleo.	e-p B&B.	Own.	m Spicer.....	1/2 F Own.....	4.30
.....	.....	.....	1750	1825	1825	117	32x4	Premier.....6-40-A	Falls.	6-3 1/2x4 1/2	23.44	Strom.	Wagner	Wagner	e-p B&B.	Mech.	m Spicer.....	3/4 F	5.00
.....	1665	.....	2385c	2475	.....	116	32x4	R & V Knight.....R	Own.	4-3 1/2x5	22.50	Strom.	Wag.	Wag.	e-p B&B.	B-L.	m Spicer.....	F Salis.....	4.75
2850	2850	2850c	3500	3700	3700	124	32x4 1/2	R & V Knight.....H	Own.	6-3 1/2x4 1/2	29.40	Strom.	A-L.	A-L.	e-p B-L.	B-L.	m Spicer.....	1/2 F Tim.....	5.40	
1645	1485	1645	1855c	1885	1885	120	32x4	Reo.....T6	Own.	6-3 1/2x5	24.34	Rayfield.	N.E.	N.E.	m-d Own.	Own.	m Own.....	1/2 F Own.....	4.70	
3200c	3200	3200c	3200c	4000	4000	131	32x4 1/2	Revere.....M	Dues.	6-4 1/2x6	30.63	Strom.	West.	Bosch.	m-d B-L.	B-L.	m Spicer.....	3/4 F Stand.	3.40	
2685	2485	2685	2750c	3585	3585d	117	32x4	Rickenbacker.....B	Own.	6-3 1/2x4 1/2	23.44	Strom.	Bosch.	Bosch.	e-p Own.	Warner.	m Mechanics.	3/4 F Col.....	4.00	
.....	.....	.....	3285	3950	4000f	128	32x4 1/2	Roamer.....6-54-E	Cont.	6-3 1/2x5 1/2	29.40	Strom.	West.	Split.	e-p B&B.	G-L.	f Snead.....	1/2 F Tim.....	4.00
3685	3485	3800	3650c	4250p	3950	138	32x4 1/2	Roamer.....6-54-E	Cont.	6-3 1/2x5 1/2	29.40	Strom.	West.	Split.	e-p B&B.	G-L.	f Snead.....	1/2 F Tim.....	4.00	
3785	.....	.....	.....	4650p	3950	128	32x4 1/2	Roamer.....4-75-E	Roeh.	4-4 1/2x6	28.90	Strom.	West.	Split.	m-d B-L.	B-L.	f Snead.....	1/2 F Tim.....	4.00
10900	10900	10950	.....	12800	12850	143 1/2	33x5	Rolls-Royce.....40-50	Own.	6-4 1/2x4 1/2	48.60	Own.	Bijur.	Bosch.	e Own.	Own.	m Own.....	F Own.....	3.35
.....	.....	.....	.....	13500	12900	118	32x4	Rubay.....	Own.	4-2 1/2x5 1/2	12.10	Strom.	Bosch.	Bosch.	e-p Own.	Own.	m Universal.	F Own.....	5.10
1645	1645	.....	2645d	2645	.....	118	33x4	Sayers Six.....DP	Cont.	6-3 1/2x4 1/2	27.34	Strom.	Deleo.	Deleo.	e-p B&B.	G-L.	m Arvae.....	1/2 F Eaton.	4.75
875	875	.....	.....	.....	.....	108	30x3 1/2	Seneca.....L-2 & O-2	Lyc.	4-3 1/2x5	19.60	Zenith.	A-L.	A-L.	e-p B&B.	G-L.	m Universal.	F Peru.....	4.75
985	985	.....	.....	.....	.....	112	31x4	Seneca.....50c & 51c	Lyc.	4-3 1/2x5	21.03	Zenith.	A-L.	A-L.	e-p B&B.	G-L.	m Universal.	F Peru.....	4.40
.....	.....	.....	.....	.....	.....	127	34x4 1/2	Standard.....99	Own.	8-3 1/2x5	33.80	Zenith.	West.	Split.	e-p B&B.	G-L.	m Arvae.....	1/2 F Tim.....	4.40
2750	2750	2750	2425g	3585	3985	130	32x4 1/2	Stanley.....740	Own.	2-4 x5	None.	Bijur.	None.	None.	None.	None.	None.	1/2 F Own.....	1.80	
319r	348	285g	.....	645	645	102	30x3 1/2	Star.....	Cont.	4-3 1/2x4 1/2	15.63	Till.	A-L.	A-L.	e-p Own.	Warner.	m Spicer.....	1/2 F Tim.....	4.50
2250	2250	2450	2275c	3150	3450	125	34x4 1/2	Stearns-Knight.....SKL4	Own.	4-3 1/2x5 1/2	22.50	Rayfield.	West.	A-K.	m-d Own.	Own.	f Climax.....	1/2 F Own.....	4.50	
2700	2700	2850	2700c	3500	4500f	130	34x4 1/2	Stearns-Knight.....6	Own.	6-3 1/2x5	27.34	Rayfield.	West.	A-K.	m-d Own.	Own.	f Climax.....	1/2 F Own.....	4.70	
1445	1395	.....	1695d	1995	.....	117	32x4	Stephens.....10	Own.	6-3 1/2x4 1/2	25.35	Strom.	Deleo.	Deleo.	e-p B&B.	Mech.	m Mech.....	1/2 F Tim.....	5.10
.....	2045	1745	2145c	1225	1550	124	33x4 1/2	Studebaker.....Light Six	Own.	6-3 1/2x4 1/2										



Doing One Thing Well

A fundamental rule of fine craftsmanship is to concentrate on one especial task.

Each unrelated effort is time and energy wasted. Each fickle departure is a side road leading away from the main goal.

Excellence is never won by vacillation. Its first condition is absolute constancy of endeavor.

In 1914, the builders of the Cadillac introduced America's first eight-cylinder automotive power plant—the V-Type Cadillac engine.

They were fully convinced that for power, smoothness and dependability, the V-Type eight-cylinder principle held the highest possibilities, and they were resolved to concentrate on the development of this one principle.

Ever since that time these engineers and craftsmen have applied

themselves whole-heartedly to the purpose of improving and refining the V-Type eight-cylinder Cadillac.

All of their skill and resources, all of their undoubted genius in engineering and manufacturing, were and are devoted to this one task.

What has since happened is automotive history.

The builders of the Cadillac have produced more than 150,000 V-Type ninety degree eight-cylinder engines and not one of these engines has ever been replaced by the factory for any reason.

Moreover, in recognition of the supremacy of the V-Type eight-cylinder principle, and of Cadillac's position as its leading exponent, more people have purchased Type 61 than all other cars combined at or above its price range.

CADILLAC MOTOR CAR COMPANY, DETROIT, MICHIGAN
Division of General Motors Corporation

CADILLAC



Standard of the World

Use Starrett Tools



because-

Starrett Tools will help you get the clean, accurate fits that mark the work of the skilled workman.

When you want tools that are handy and convenient to use and will give you a *lifetime's* accurate service—ask for Starrett.

THE L. S. STARRETT CO.

*The World's Greatest Toolmakers
Manufacturers of Hacksaws Unexcelled*

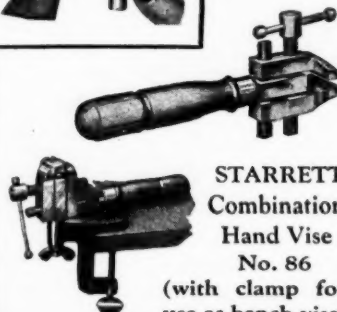
ATHOL, MASS.



**STARRETT
Thickness Gage
No. 71**

Supplement to Starrett Catalog No. 22 "RB" describes these new tools. Write for free copy if hardware store can't supply you.

**STARRETT
Drill Point
Gage No. 22**
(for grinding
drill points
accurately)



**STARRETT
Combination
Hand Vise
No. 86**
(with clamp for
use as bench vise)

5366

Rickenbacker

A • CAR • WORTHY • OF • ITS • NAME

4-wheel BRAKES

Again—Rickenbacker Engineering Leads and Shows the Way

And now—we announce the greatest improvement made in an automobile since the advent of the self-starter—13 years ago.

Here is a feature that is super-efficient; for not only do the four wheel brakes increase your tire mileage and eliminate all tendency to skid, but they offer the only practical solution of the twin problems of congested traffic and public safety.

So convinced are we of the superiority of four brakes over two, we predict that one year from today 4-wheel brakes will be universal.

The superiority is so marked and so manifest, there is just no ground left for argument.

Amazing in performance.

Does not affect steering unless it be to give you better control of the car when turning.

Actually stops car as quickly on wet asphalt as on dry.

Equalized as no other braking system has ever been equalized—to compensate, not only for difference in traction of each wheel, but for difference in wear of shoes and drums.

Drums are finely machined to ensure absolute uniformity and smoothness of operation. Another example of Rickenbacker thoroughness and care.

Think of this greatly increased factor of safety—100 per cent more than you have been accustomed to.

Here is the only practical solution of the traffic problem.

You can stop in a car length at any reasonable speed—or glide to a velvety pause, in half the distance you are used to.

No, NOT hydraulic—pneumatic—or electric.

Mechanical—positive—simple—sure—a system any child can understand.

Full information and literature from the factory.

RICKENBACKER MOTOR COMPANY
DETROIT MICHIGAN



(See next page)

Rickenbacker

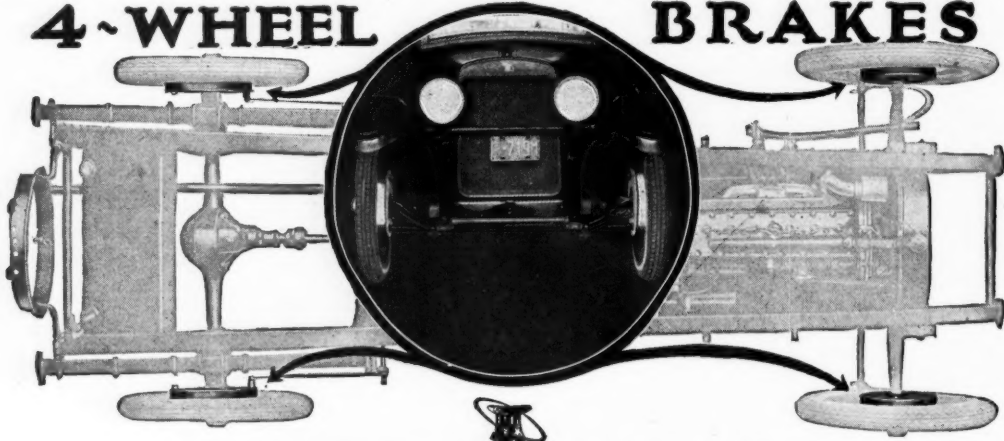
A • CAR • WORTHY • OF • ITS • NAME

*here's the Smashing Big
Double Spread in the*

SATURDAY EVENING POST and COLLIER'S WEEKLY

reaching over 3,205,894 homes

4-WHEEL BRAKES



Again Rickenbacker Engineers Lead and Show the Way—

Here is the greatest improvement made in an automobile since the advent of the Self-starter—thirteen years ago.

Like the tandem flywheel, which Rickenbacker engineers also invented—the air cleaner, which excludes dust, sand and other foreign matter from the cylinders—4-wheel brakes are now a Rickenbacker feature.

Brakes on all four wheels have always been desirable. Until recently, however, this has been unobtainable.

Problem, of course was to equate the effect—on the pressure, but the ultimate result—on all four wheels under all conditions of driving.

This our engineers have accomplished so thoroughly that you will be amazed—your enthusiasm will know no bounds—when you see how this Rickenbacker Six performs on any kind of surface and under any conditions of driving.

Greatest revelation of all will be the fact that this car stops just so quickly and without the slightest tendency to skid on wet asphalt as on dry.

That tendency to skid (to which you have become accustomed when your brakes are applied) is eliminated by the Rickenbacker system of 4-wheel brakes.

Space forbids even a brief outline of this epoch-making achievement.

There are so many ways in which this improves the performance of a car, enhances safety and increases both tire and gasoline mileage, 'twould require a volume to tell it. Only way to satisfy yourself is to see and drive this latest Rickenbacker Six.

Just after a rain when the streets are slippery with grease and water, is the ideal time. Then you get the full effect.

And you will agree with our assertion that here is the greatest advance made in luxurious and safe motoring since the perfection of the self-starter.

Your Rickenbacker dealer will be glad to give you any kind of demonstration you may suggest.

Better phone him—today.

RICKENBACKER MOTOR COMPANY, DETROIT, MICHIGAN, U. S. A.

Rickenbacker Six

A • CAR • WORTHY • OF • ITS • NAME

Rickenbacker Adv. No. 279 Collier July 14, 1923

Two double spreads! In Collier's July 7th—in
The Saturday Evening Post July 14th! Above is a
reproduction of the announcement.

Every dealer knows the effect of such big advertising.
The news of this great improvement will get into

every city, town and hamlet in the country.

Demand will be tremendous—already is, in fact.
The eyes of the country are on Rickenbacker—the
car that has pioneered so many engineering
refinements.

RICKENBACKER MOTOR COMPANY
DETROIT MICHIGAN



Rickenbacker

A • CAR • WORTHY • OF • ITS • NAME

Rickenbacker Six

A • CAR • WORTHY • OF • ITS • NAME

4-wheel BRAKES

Again—Rickenbacker Engineering Leads, and Shows the Way

First—assumed that braking, by creating a motor fire from any point of view—the most destructive force in an automobile.

The Rickenbacker "Landon Flywheel" accomplished this.

Then the "Air Chamber"—which doubles the life and reduces your motor fire from excessive engine demands.

And now—no more the greatest improvement made in an automobile since the advent of the self-starter—11 years ago.

Here is a history that is representative for not only the Rickenbacker Six, but for all cars of the type, and for the entire industry.

With the same effect, you are in about half the distance—without the strain on tires, the strain on the engine, the strain on the driver, the strain on the passengers.

Go, with much less effort, your car stops in the same distance with still less strain on time and space.

For, if we told you how the advantages of this Rickenbacker Six would be compared to the rest.

One cannot believe, until he himself has experienced the sensation, of riding forward driving—a Rickenbacker with 4-wheel brakes.

So convinced are we of the superiority of four wheel brakes, we predict that one year from today 4-wheel brakes will be universal.

Remember this when trial salesman try to argue against 4-wheel brakes—for of course they want, not having them, yet.

There is just no ground left for argument.

As we have stated, this is, and will be, regarded as the greatest safety improvement in an automobile since the advent of the self-starter.

Here is a self-starter—if you will.

Stop and start without strain in the gas pedal.

Directly stops car on wet roads, without strain.

4-wheel brakes do on dry, with no straining.

There is a feeling of security when driving on a wet or slippery surface that is indescribable.

Remember in the future, looking upon the Rickenbacker Six, you will see the difference in year of advance and drive.

Driving on roads, equipped to answer adequate demands in emergency of operation, and other examples of Rickenbacker's thoroughness, are not to be denied.

Think of this greatly increased factor of safety—11 years ago!—more than you have been accustomed to.

Here is a mighty long step towards the solution of the brake problem.

You can stop in "a car length" at any level ground—no strain to a driver's power. In fact the distance you are used to.

No, NOT hydraulic—pneumatic—or electric. Mechanical—positive—simple—sure—a system very child can understand.

4-wheel brakes were longer because the coefficient of friction per square inch of braking surface is less than half of what it is in two.

Then, use longer for the same reason. Brakes longer, the more.

Silent, and uniformly efficient at all times and under all conditions—on all four wheels at the wheel, expanding type—most solid.

By the way—Rickenbacker brake drums are finished a brilliant red, so that you will easily recognize this feature in a Rickenbacker Six.

All four brakes, after examination! That is, a complete mechanical inspection.

Of course you would that the Rickenbacker Six, the first Rickenbacker Six, had not done this. That is, that the Rickenbacker Six, the first Rickenbacker Six, had not done this.

And now—the latest Rickenbacker innovation—will subject to the leader of the progress, the 4-wheel brake.

So magnificent brake.

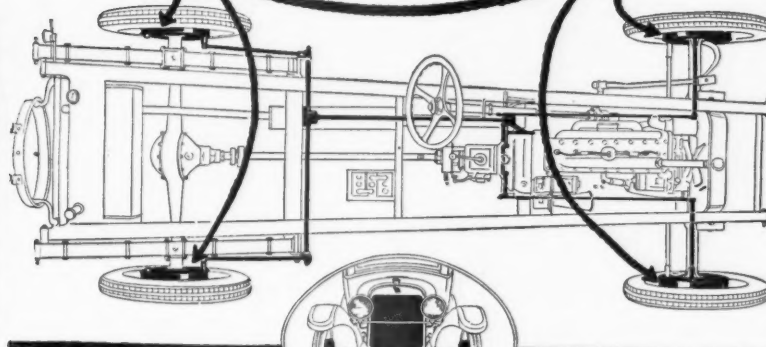
When such a car is made, and one has been such a car, in the Rickenbacker Six, you will enjoy entering in your new car.

Phone, or come in and arrange for your demonstration.

Don't delay. First come must be first shown—last, of course, every progressive motorist in town will want a ride in the sensational Rickenbacker Six—4-wheel brakes.

RICKENBACKER MOTOR COMPANY, DETROIT, MICHIGAN

(Dealer's Name
Telephone and Address here)
(In style and size of type shown)



Here's Our
Commanding
Newspaper Page
going in over

500

of the leading
Newspapers
reaching over
18,000,000
homes

And here is the Rickenbacker newspaper copy—a full page. Going into 500 of the leading American dailies.

Every up-and-coming dealer knows that such a far reaching advertising campaign gives Rickenbacker dealers a decided advantage.

For, full pages in 500 of the leading newspapers mean the use of practically every worth while paper in the United States.

Such campaigns do not happen every day. Is your factory giving you this kind of cooperation?

Rickenbacker is not only the most progressive from an engineering standpoint, but likewise the most progressive from a merchandising standpoint.

The prosperity of Rickenbacker dealers is proof conclusive of the foregoing statement.

RICKENBACKER MOTOR COMPANY
DETROIT MICHIGAN



(See next page)

Rickenbacker

A • CAR • WORTHY • OF • ITS • NAME

This latest and greatest
Rickenbacker
has more advanced
engineering features than any
other car on the American
or European Market

4-Wheel Brakes
Tandem Flywheel
Air Cleaner
Differential
Brake Equalizers

RICKENBACKER MOTOR COMPANY
DETROIT MICHIGAN





The Van Norman Re-Li-O Grinder For Complete Grinding and Turning Service

Don't let profitable business slip away from you because you're not equipped to do a complete repair job.

The Van Norman Re-Li-O provides you with a complete grinding department. It enables you to handle a large volume of work such as grinding and re-grooving of pistons, grinding wrist pins, valves, armatures, ignition points, etc.

The Van Norman Re-Li-O is a compact rigidly designed wet grinder with improved turning tool holder which permits turning without the removal of the grinding wheel.

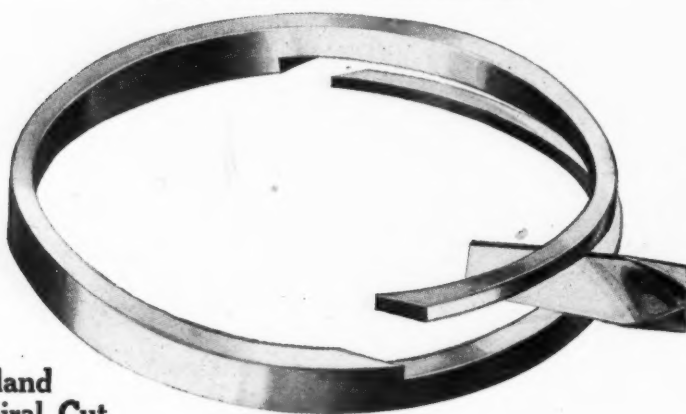
If you're interested in a smaller machine, one that's readily portable, ask about Re-Li-O No. 1, without base. For Valve Grinding there's nothing better than the famous Franklin, Model B—adopted as standard Service Station equipment by more than a score of automobile manufacturers. Ask for Bulletin.

5514



Van Norman machine tool co.
SPRINGFIELD - MASS.

This is one of a series of ads, each featuring one member of the Inland Complete Piston Service Line.



**Inland
Spiral Cut**

The Peer of Piston Rings

This is the famous one-piece ring whose construction is different from every other ring on the market. The Inland Spiral Cut has always been a one-piece ring and has all the good features claimed for multiple piece rings.

The spiral form causes a natural tendency to uncoil against the cylinder walls like a spring, but with great uniformity of pressure all around.

The overlapping flexible ends permit the ring quickly to adjust itself to irregularities in the cylinder walls and to "follow the wear." Inland Spiral Cut Rings are notable for long life and satisfactory service, making them the most economical of all rings.

The Inland special Electro-Thermic heat treatment sets the tension permanently and the human element is entirely eliminated by every operation being automatically controlled. And every single ring is sorted to extremely close limits through very sensitive dial gauges of Inland design.

Your work is sure to satisfy when you use Inland Spiral Cut Rings.

TRADE MARK
REG. U.S. PAT. OFF.
AND
FOREIGN COUNTRIES.



The Inland Complete Piston Service Line

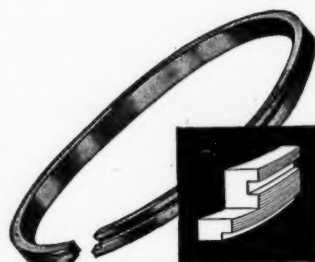
Regrinders — Reborers — Repairmen — Consider the advantage of getting replacement Pistons, Rings and Pins all from the same source—all accurately fitting each other. Talk to an Inland Jobber. If you don't know his name, ask us.

Our new booklet, "The Story With a Ring To It," tells all about the Inland Complete Piston Service Line. Write for it.

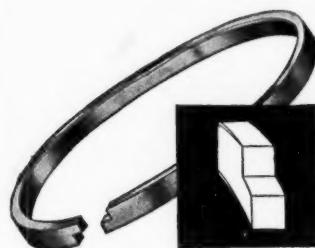
INLAND PRODUCTS COMPANY, INC.

Stocks in Principal Cities

Main Office and Factory: St. Louis, U. S. A.



**Inland Oilless
Piston Ring**



**Inland Step-Set
Piston Ring**



**Inland Replacement
Piston Pins**

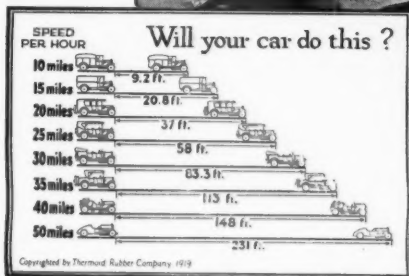
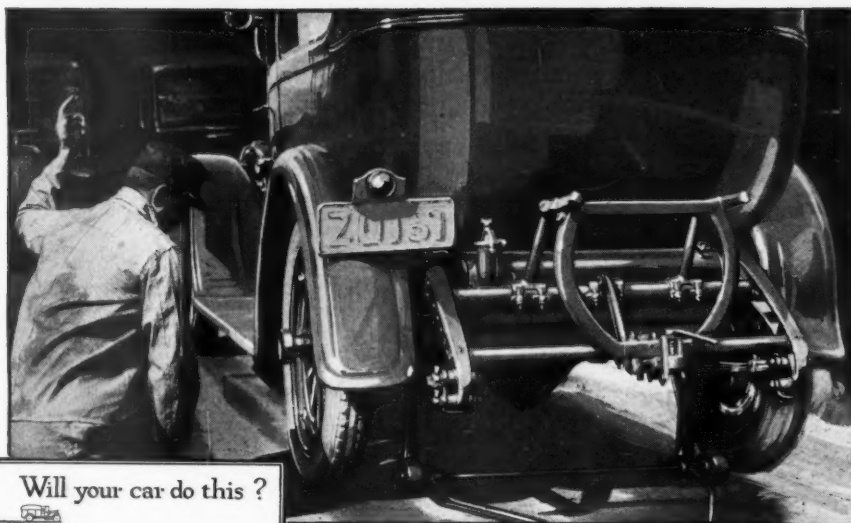


**Inland Replacement
Pistons**

G-243

INLAND

Famous Thermoid Standard Chart—shows distances in which car should stop if brakes are efficient. Brakes lined with Thermoid meet these standards.



Brake Bands equally spaced

but one wheel always stops first—

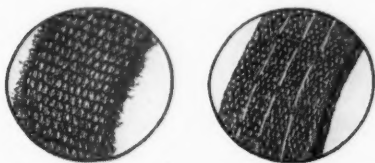
Jack up the rear—put an ordinary soft lining on one band, Thermoid Hydraulic Compressed Lining on the other. Space the adjustments equally, let 'er spin, and put on the brakes.

The wheel braked by Thermoid stops first.

Now adjust the ordinary brake lining closer, and repeat the test. Even after several adjustments Thermoid will still stop its wheel first.

Compression removes the "give"

Thermoid Brake Lining grips like this because all further "give" is compressed out



Left: Steady wear soon squeezes out "ragged edge" on ordinary soft brake lining. This means poor wear and frequent adjustments.

Right: Thermoid Hydraulic Compressed Lining is too dense and compact to squeeze out. Wears down slowly, grips when worn wafer-thin. Needs fewer adjustments.

under 2000 pounds hydraulic pressure! This makes Thermoid so dense, so compact, that it grips from the first day on. Your customers don't have to break it in!

Why Thermoid is last to "squeeze out"

We take the "give" out of Thermoid in the factory—in its place we put 40% more material. That's why Thermoid is last to show the "ragged edge" between drum and brake band.

Remember this: when you relined with Thermoid, you're giving your man not only absolute protection and longer wear, but a definite money-saving through fewer needed adjustments.

Get your share of this profitable relining business—write for full information about the sales helps furnished to all Thermoid dealers.

THERMOID RUBBER COMPANY

Factory and Main Offices, Trenton, N. J.

New York	Chicago	Los Angeles	Detroit
Cleveland	Kansas City	Seattle	Atlanta
Boston	London	Paris	Turin
	San Francisco		

Thermoid Brake Lining

Hydraulic Compressed

Makers of "Thermoid-Hardy Universal Joints"
and "Thermoid Crolide Compound Tires"



Intact after 48 hours in oil!

A unique test which proved that ONE Ford Transmission Lining retains its compounds

Proper lubrication is impossible with most Ford transmission linings. The treated linings grip fairly well, but soon dissolve their compounds in the oil. Fouling of the power plant follows.

Then the engineers of the Thermoid Rubber Company invented *Rexoid*.

Its treating compound provided high and lasting friction. Then they vulcanized it—under tremendous pressure—into every fibre of the woven fabric.

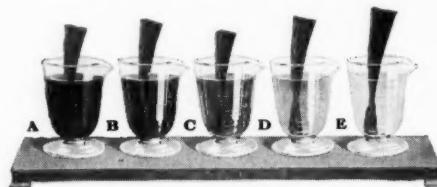
Exhaustive tests proved that here, at last, was one transmission lining whose compounds were *insoluble in oil*.

An astonishing difference in five leading makes

In the next column is shown a startling test of five different makes of treated lining. The varying shades of the oil in the beakers mark the extent to which each make dissolved its compounds in the short space of *six hours*. One remained absolutely clear—not only after six but after forty-eight hours of continuous soaking.

The lining it held was *Rexoid*—the new Ford transmission lining.

Only in *Rexoid* do your customers get this insoluble compound. It is practically vulcanized into every fibre of a high-grade



After 48 hours in oil, four makes of lining (A, B, C, and D) had discolored the oil, giving off tar and other harmful ingredients. The only lining that did not foul up the oil was E—Rexoid.

woven fabric. Compound and fabric become one solid mass.

This hydraulic treatment gives *Rexoid*

1. More material to the square inch
2. A smoother surface and a longer life.

Tell your trade the facts about *Rexoid*. It's easy to sell, and because it fills a real need your customers are satisfied. This means continuous profits to you.

Leading jobbers carry *Rexoid*. If your jobber cannot supply you, send us his name.

THERMOID RUBBER COMPANY

Factory and Main Offices, Trenton, N. J.

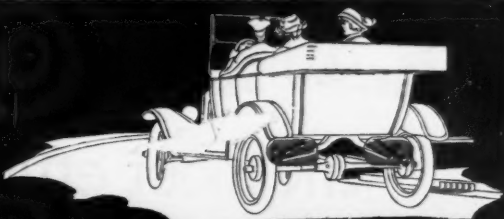
New York	Chicago	Los Angeles	Detroit
Cleveland	Kansas City	Seattle	Atlanta
Boston	London	Paris	Turin
	San Francisco		

REXOID

Transmission Lining for Ford Cars



Car Keeps to Road You Stay on Seat



Makes Distribution Successful

A product that is a success; a market practically unlimited; the backing of an established institution—that is what we have to offer every Drednaut distributor. A sales organization with sufficient capital and ability to give Drednaut Equalizers the representation they deserve—that is what we expect of our distributors. An unqualified success—that is what Drednaut distributors may expect and get. Here is an opportunity seldom presented—one which demands your immediate attention. Accessory distributors in non-competing lines, men of vision who want to engage in a profitable business, wire or write for open territory.

AUTO SPECIALTIES MFG. COMPANY, 577 Graves Street, St. Joseph, Mich.
Also a Canadian Factory at Windsor, Ont.

DEALERS — Every Ford owner needs Drednauts and wants them. Why not become a Drednaut dealer? Write us on your business stationery for our liberal proposition now.

DREDNAUT

Equalizers FOR FORDS

"CUSHION THE ROAD"

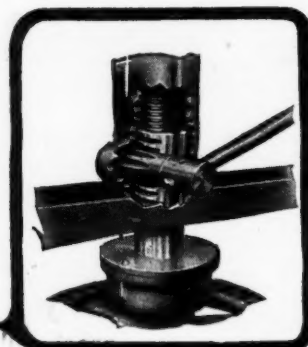
WEAVER Hi-Speed Press

-the most efficient press on the market

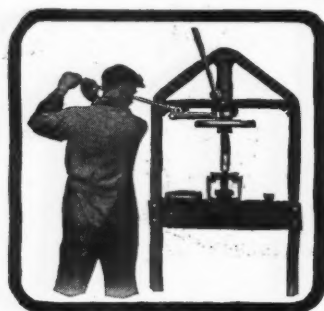


The high speed lever handles light work with extreme speed and accuracy.

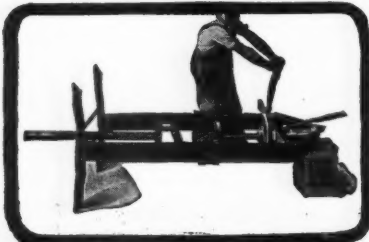
judge for yourself



Pinion meshes into sleeve over Press screw. Sleeve is attached to thrust bearing plate so that operation of lever lowers hand wheel and screw as a unit.



When greater power is needed, pressure up to 28 tons can be exerted without moving work. Two leverages, 1,500 to 1 with lever in lower notch; 3,000 to 1 with lever in upper notch.



Vertical operation of lever makes it unnecessary to bolt Press to floor. Press can be turned on its side and operated horizontally or moved about shop.



Face plate, two pressure blocks, two vice blocks and two sections of 6 inch channel steel furnished.

The best equipped shop gets the business.

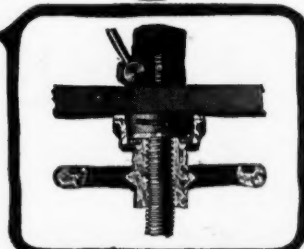
WEAVER MFG. CO.

Springfield, Illinois, U. S. A.

WEAVER CANADIAN CO., Ltd., Chatham, Ontario.

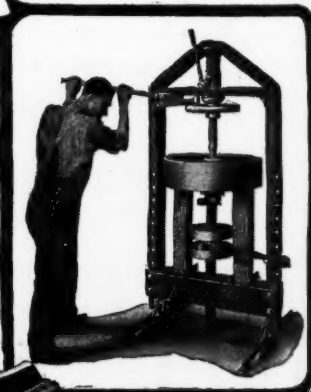
One piece steel frame, no bolted joints to develop weakness.

Top reinforced by rigid brace construction to prevent springing.



Quick release construction enables pressure on screw to be relieved instantly.

32 inches and 42 inches



Unusual width of frame extending entire height of Press permits bulky work to be handled easily. Adjustable bolster insures work always in direct contact with Press screw.

Write for catalog on our complete line of equipment.

Judge the Kissel Franchise by Profits That Kissel Distributors Are Making Now—

By the fact that Kissel production in the first quarter of this year was 300% above the same period last year and practically double that figure in the second quarter.

Kissel's expansion is not the "flash in the pan" of an untried car. Behind it are seventeen years of solid successful experience, without receiverships, hurried financing or ill-advised "combinations."

In a year when the automobile industry is prosperous, but when competition is keener than ever before, present sales records are an index to future prosperity.

Was there ever a better time to select a permanently profitable franchise?

To the right dealers we can offer a custom-built car, priced in the \$1500 class, that is showing the way in performance the country over.

If you are interested, write or wire us.

THE KISSEL MOTOR CAR CO.

Hartford, Wisconsin

KISSEL

The Custom

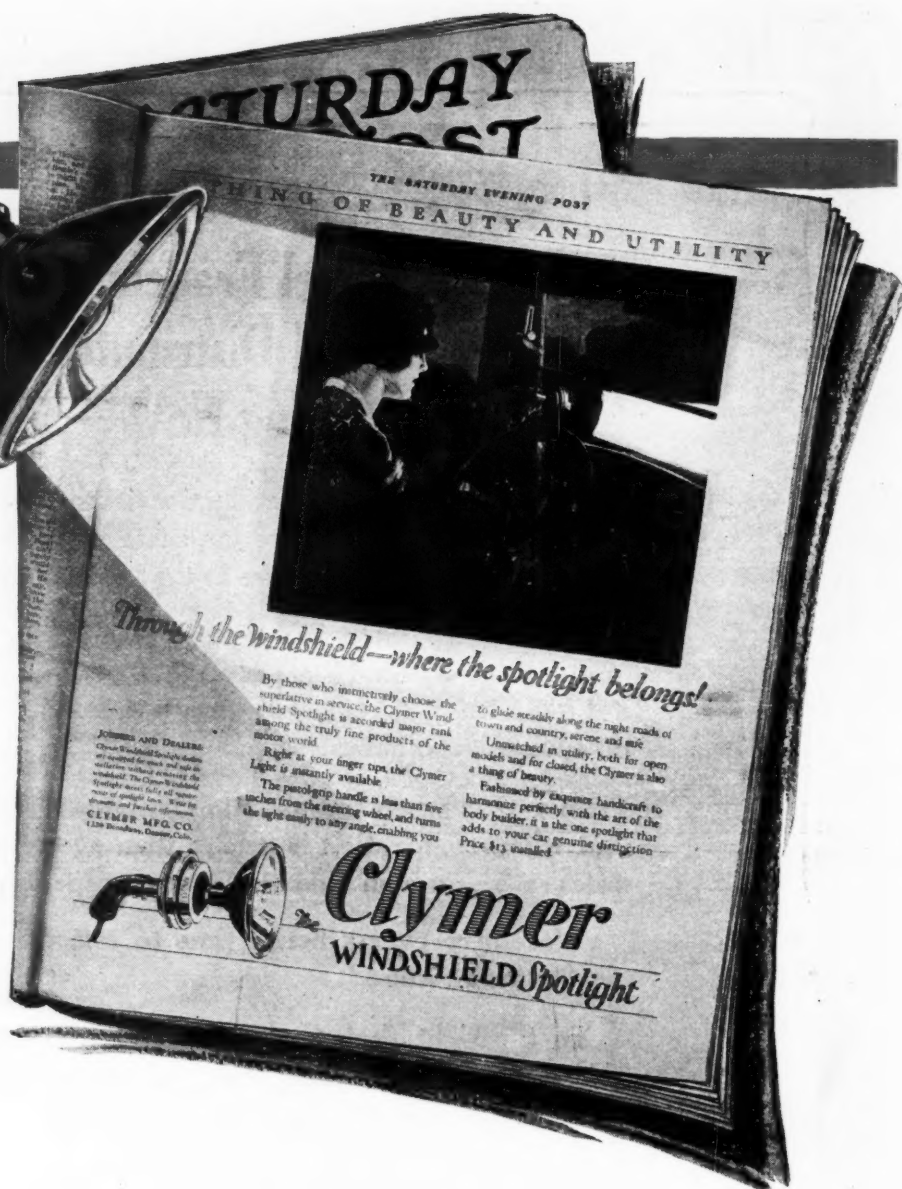


Built Car



Pistol Grip
Handle—
Right at Your
Finger Tips
for Instant Use

Opening Gun
of the Biggest National Advertising Campaign Ever Devoted to a Spotlight. This July 21st page in The Saturday Evening Post will be followed by regular insertions throughout the year.



Dealers Get Quick Results

"We know of nothing so readily saleable or that gives the consumer as great satisfaction," writes one Jobber (name on request) after eleven months selling The Clymer Windshield Spotlight. "They are being installed by all dealers now in a few minutes and with absolutely no breakage.

"Your success, of course, has already been

proven, but it appears to me that your lamp will not only greatly increase the use of spotlights, but to my mind, its advantages are so great that IT MAKES ALL OTHER TYPES OBSOLETE.

"We find that the normal sale of spotlights at half the price and less, with the ordinary dealer, is HARDLY ONE-THIRD the number of Clymers that can be sold by the same dealer."

Through the windshield—where the spotlight belongs!

It took this 12 year old negro boy only 1 minute and 2 seconds to cut the hole in the windshield with the new Clymer Portable Cutter. So State Auditor Stong of Colorado, referee of this hole-drilling contest, awarded him the first cash prize. The other boys, also picked at random from the streets of Denver, averaged 1 minute and 41 seconds. Mr. Stong reported that "all of the holes were drilled perfectly smooth."



Easiest to Sell, Easier to Install

No awkward clamps to adjust, no removing of glass or windshield. Merely cut the hole—which anyone can safely do in 2 minutes—then tighten two flanges and a set screw and make the electrical connections. It is then ready for use.

Installation *always the same* for all makes of cars.

The Clymer is the original Through-

the-Windshield Spotlight, and is fully protected by its patents.

New Clymer Portable Cutter Free
Special Clymer deal lets jobber supply new Clymer Portable Cutter to all Dealers on initial order for eight Clymer Windshield Spotlights. New policy sells through the Jobber and assures right margin of profit. Get all the facts now by using coupon below.

THE CLYMER MFG. COMPANY, Dept. B, DENVER, COLO.

Jobbers and Dealers: Sign and mail today—

The Clymer
WINDSHIELD Spotlight

The Clymer Mfg. Co., Dept. B, Denver, Colo.

Send full information about the Clymer Windshield Spotlight and Free Portable Cutter.

Name _____

Street _____

City _____ State _____

(Dealers) Who is your jobber? _____



(Reproduced from Saturday Evening Post Auburn Ad for July 14th)

No Auburn dealer ever made
a bad trade because the fac-
tory forced shipments on him.

This money making franchise may be
open in your territory. *Better wire now.*

A Complete Line—Sixes Exclusively

6-43 SERIES (114" Wheelbase)

6-43 Touring	\$1165
6-43 Chesterfield Touring	1275
6-43 Touring-Sedan	1535
<i>(Freight and tax extra)</i>	

6-63 SERIES (122" Wheelbase)

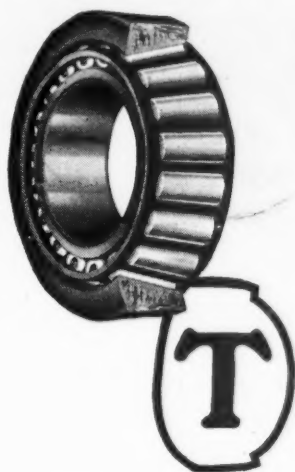
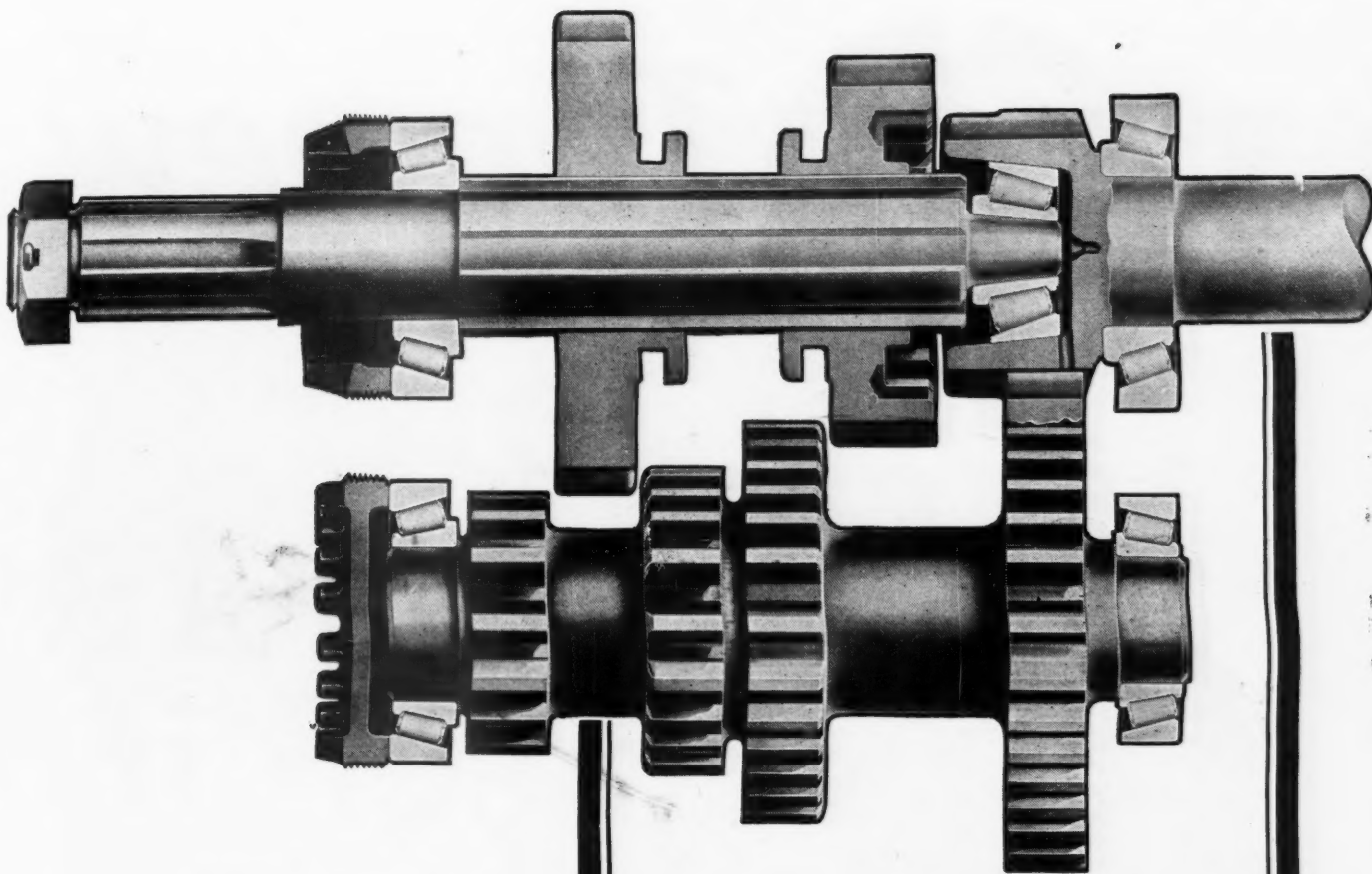
Six Supreme Touring	\$1725
Six Supreme Sport	1985
Six Supreme Brougham	2045
Six Supreme Sedan	2345

AUBURN AUTOMOBILE CO., AUBURN, INDIANA

"ONCE AN OWNER



ALWAYS A FRIEND"



Keeping Them Quiet

Not only do Timken bearings fully answer the basic requirements for any transmission bearing layout—ability to carry radial loads, thrust loads, and resultant loads, at speed—

Not only do Timkens simplify this layout problem by carrying these loads *simultaneously* without complications—

But in addition the use of Timkens makes possible a decided advance along the path of an important automotive trend of today—

Study the transmission design shown above. Note that both the main shaft and the countershaft are readily adjustable by the turning up of an adjusting ring, externally reached. Except by accessible adjustability how can the user be assured of a transmission which will always have the silence and easy-shifting properties resulting from constantly correct shaft alignment?—

Which is the result of Timken adjustability for the wear that *must* follow motion.

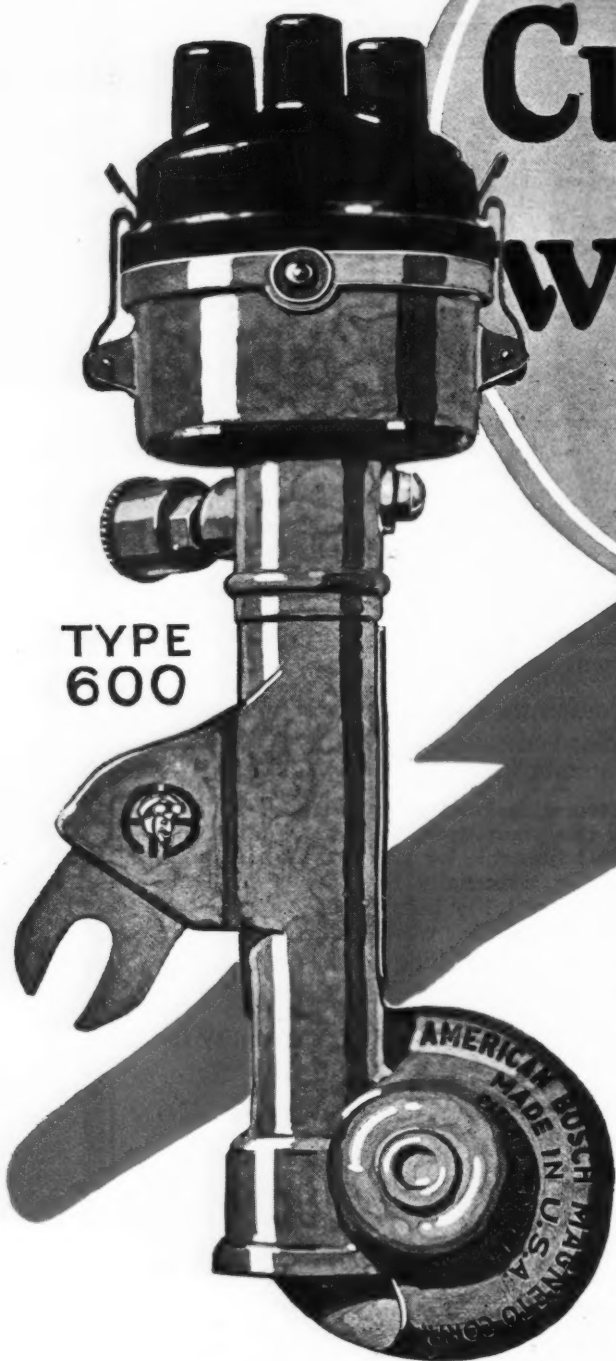
The Timken Roller Bearing Co
CANTON, OHIO

TIMKEN
Tapered
ROLLER BEARINGS



The new **Your Customers will sell it for you**

**TYPE
600**



If you want to see a real enthusiast, get in touch with any Ford owner using Bosch Type 600 Ignition.

He's so pleased at the wonderful improvement in his engine that he is anxious to tell everybody about it—

He shows them how smoothly the engine runs—how easily she starts—how quickly she accelerates—how powerful she is on the hills. He boasts that he doesn't have to bother with the spark lever when driving—seldom has to clean the plugs—never has any ignition troubles.

BOSCH

IGNITION SYSTEM

for FORDS

He's the best salesman in the world—and he works for nothing!

Start him working for you. Sell him a Type 600 System for his Ford and he'll start bragging about it to his neighbors. They'll soon be in to see you—to buy Type 600 Systems, and a lot of other merchandise, too—

You can make a clean-up this summer if you get a lot of Ford owners boosting for you. The old cash register will play a merry tune right through the year.

Make your shop the Type 600 Headquarters in your section—Don't let the other dealers beat you to it.

Wire for sales plan and a sample outfit C. O. D. Get started TODAY.

American Bosch Magneto Corp.
Springfield, Mass.

NEW YORK

CHICAGO

DETROIT

SAN FRANCISCO

The Bosch De Luxe System, Type 513

is made for Fords using storage batteries. This system, which includes the Bosch Coil and Compensating Governor, becomes a definite part of the engine. It is extremely popular, as it gives wonderful service—thousands are sold monthly. Price is \$25.00 complete.

What it does

- 1—Makes Easy Starting
- 2—Keeps Plugs Clean
- 3—Prevents "bucking"
- 4—Gives More Power
- 5—Saves Gas and Repair Bills
- 6—Stops Timer Troubles
- 7—Pays for Itself
- 8—Prevents Short Circuits
- 9—Cuts Down Vibration
- 10—Eliminates Spark Lever

\$ **12⁷⁵**
and tax

Ask Your Jobber for



Rack FREE with Your
Initial Order for 25 Springs

VULCAN
QUALITY

SPRINGS

If your Jobber fails to give you Vulcan Service, order from our nearest branch.

JENKINS VULCAN SPRING CO., RICHMOND, IND.

Atlanta
M. & M. Warehouse Co.

Boston
171-A Mass. Ave.

Dallas
2216 Commerce St.

St. Louis
Main and Cedar Sts.

San Francisco
1035 Polk Street

Portland
448 Glisan St.

Seattle
1241 Railroad Ave.

The Nearest Approach to Perfection in the History of Tire Building

Over 600,000 Fisk Cord Tires 31x4 straight side (a new size and style in 1921) were sold in the first 18 months of production, with a return of less than 50, or under 1-100 of 1% for any claim or evidence of imperfection.

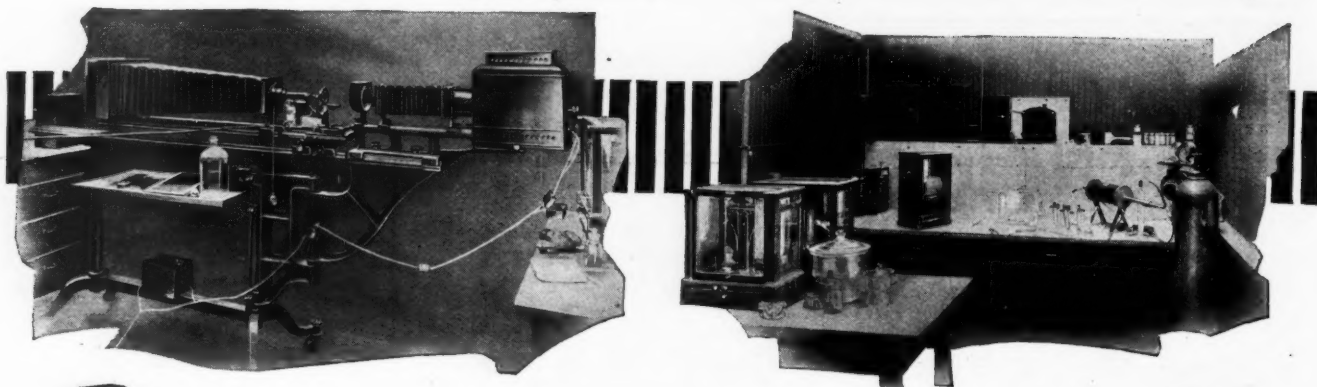
That means that if you sold 1100 of these 31x4 Fisk Cords in a year and a half only one of them was presented with a request for adjustment.

This astounding record is a clinching reason why every tire dealer who wants to do a real volume of business should put his selling energy where it will make him the biggest profit—behind Fisk Tires!

It is a great line—unbeatable cords, the unapproached Red-Top, the luxurious Flat-Tread—every one a remarkable tire, every one a profitable, increasing and *permanent* trade-builder.

*There's a Fisk Tire of extra value for
every car, truck or speed wagon*





Factors in **STROM** Supremacy

No. 3—Testing Raw Material

To uphold the ideal of perfection in ball bearing performance, STROM laboratories have established very definitely the chemical and physical requirements for STROM bearing-steel. *And not a bar of steel may go into process unless it comes up to STROM specifications.* The most advanced methods for determining and verifying correct analysis, structure, heat treatment, etc.—all form a part of the routine check which begins with the receipt of the raw material and ends only with the finished product. Just another reason why STROM guaranteed ball bearings, for new or replacement work, leave Power unshackled—

"Wherever a Shaft Turns"

(1977)



*An Organization
Built for Precision*

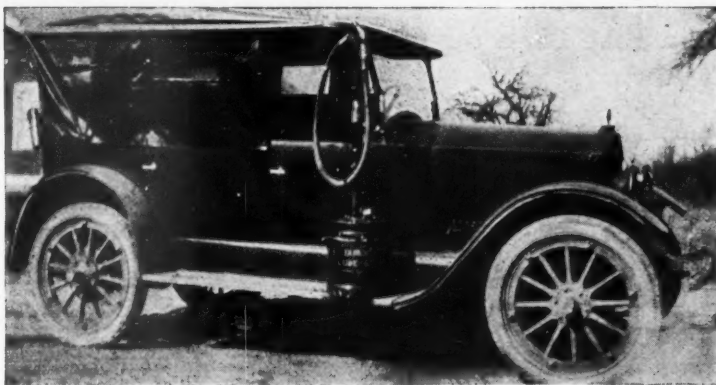
*Scientific in Principle
and Practice*

STROM

BALL BEARINGS

U. S. Ball Bearing Mfg. Co.
4551 Palmer St., Chicago

BOWSER



Information about the Lube-ster is so sought after by filling stations and garages that Bowser salesmen are now forced to carry the outfit with them. This picture shows the way they do it.

It's the handiest oil display case ever built.

It gets interest as well as attention and brings customers back because of quick service and full measure of clean oil.

Write today for folder A-14 and we will send you free advertisement suggestion on "How to Sell Him Oil, Too".

S.F. BOWSER & COMPANY, Inc.

Pump and Tank Headquarters

FORT WAYNE, INDIANA.

Sales and Service Offices and Representatives Everywhere

TANKS DEPENDABLE PUMPS



Why Are the Cylinders of All Quality Cars GROUND?

Repairshops considering the buying of equipment for resizing cylinders should be guided by certain FACTS, a few of which are here set down.

The cylinders of ALL quality cars and many of the medium and low priced cars are invariably ground. This should be all the proof anyone needs as to the best method for refinishing cylinder walls. Other methods may have advantages but close inspection reveals a surface subject to very rapid wear. When wear occurs, the cylinders, instead of being the right size are OVER-SIZE, producing "piston slap," the very condition to be overcome.

In some methods of cylinder finishing, it is necessary for the tool to get under the surface skin of the worn and highly polished wall. To do this it is necessary to enlarge the hole from THREE to SIX TIMES and also have a considerable pressure upon the cylinder wall. Due to the water-jacket this wall is supported in

places and unsupported in others. Where supported, the tool cuts slightly heavier, and we have what results in a "low" spot. Where it is not supported it springs away from the tool and there results a "high" spot.

ON THE OTHER HAND—

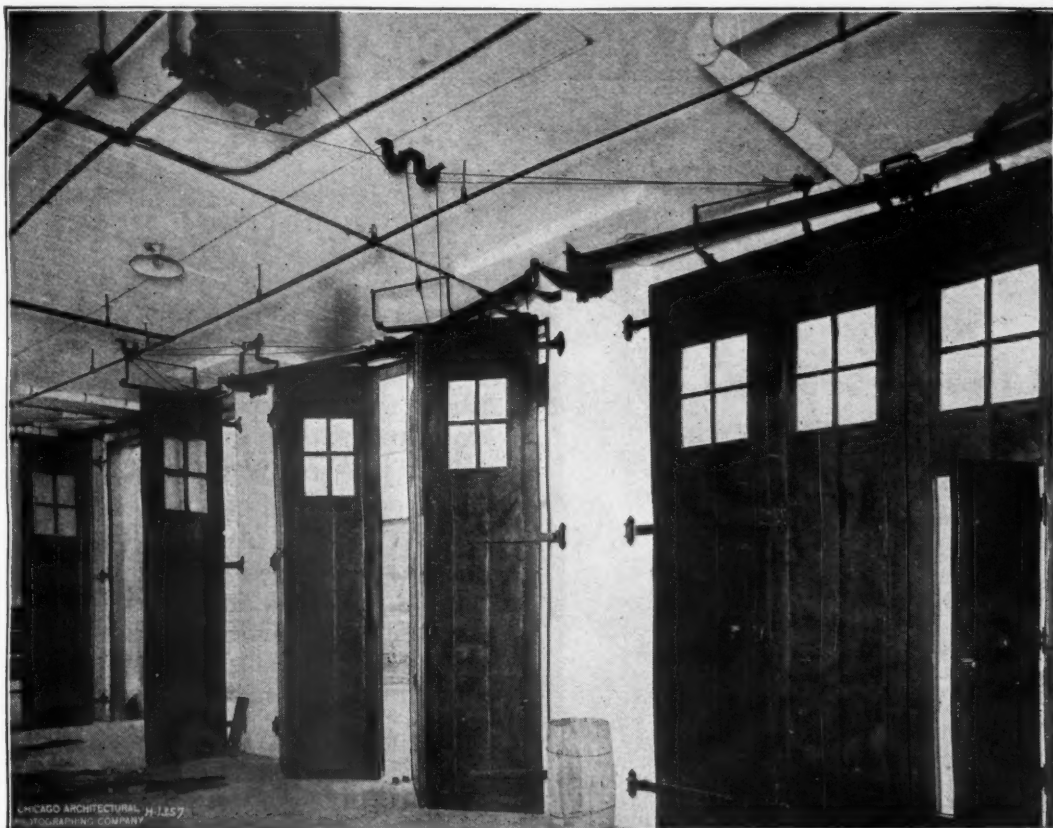
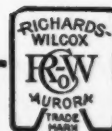
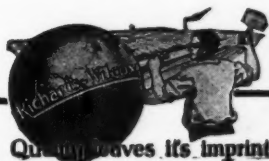
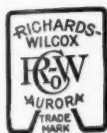
When cylinders are ground on a grinding machine, the pressure against the wall is very slight—never enough to cause springing away from the wheel. Result, on high or low spots—a glass-smooth STRAIGHT, ACCURATE hole, NO particles of abrasive imbedded in the surface of the wall, NOT subject to rapid wear. Ground Pistons fitted correctly to ground cylinders require little breaking in. They are RIGHT when the job is turned over to the car owner and remain RIGHT.

The LANDIS CYLINDER GRINDING MACHINE is especially well suited for resizing work. Nothing complicated like some machines with their 10 to 12 speeds—the Landis has but 2 traverse speeds, 2 eccentric speeds, 2 spindle speeds. Comes COMPLETE, ready to tackle any regular job without the expense of extras. The price is a feature.



Complete LANDIS equipment in the up-to-the-minute plant of the Precision Motor Re-Grinding Co., Hohokus, N. J. Mr. McWane states that he is 100% sold on his LANDIS Grinding Machines and cannot imagine what could be added to them to increase their efficiency.

LANDIS TOOL COMPANY, Waynesboro, Penna.
New York Office: 51 Chambers St.



Stop Big Door Troubles with R-W Electric Operators and *Slidetite* Garage Door Hardware

The operation and maintenance of big garage doors will sooner or later be a source of trouble and expense unless the doors are properly hung.

"Slidetite" Garage Door Hardware is designed to meet the special requirements of this class of doorway. Through properly distributed support sagging is prevented. Doors slide and fold smoothly and easily to one side, leaving entire width of doorway unobstructed. No surface exposed to the wind, thus preventing accidental slamming. Suitable "Slidetite" equipment can be had for every doorway from the one-car garage to a large opening 30 feet in width.

The illustration shows a complete installation of three four-door sets of "Slidetite" in the new garage of the Hebard Storage Warehouse, Chicago. These doors are operated by the R-W Electric Door Operator, which permits instant automatic control of doors from any convenient point. This entire installation is giving complete satisfaction.

Write for "Slidetite" Catalog X-29, and details of how our Engineering Department can assist you in overcoming any garage door difficulties.

New York
Boston
Philadelphia
Cleveland
Indianapolis
St. Louis

Richards-Wilcox Mfg. Co.

"A Hanger for any Door that Slides."

AURORA, ILLINOIS, U.S.A.

RICHARDS-WILCOX CANADIAN CO. LTD.
Winnipeg LONDON, ONT. Montreal

Chicago
Minneapolis
Omaha
Kansas City
Los Angeles
San Francisco



A Few "Nots" About Separator-Rings

The balls in a bearing must be kept apart—that's the function of a separator. It should accomplish this important work, but not do a thing more—it should NOT jam or wedge; it should NOT run out of center.

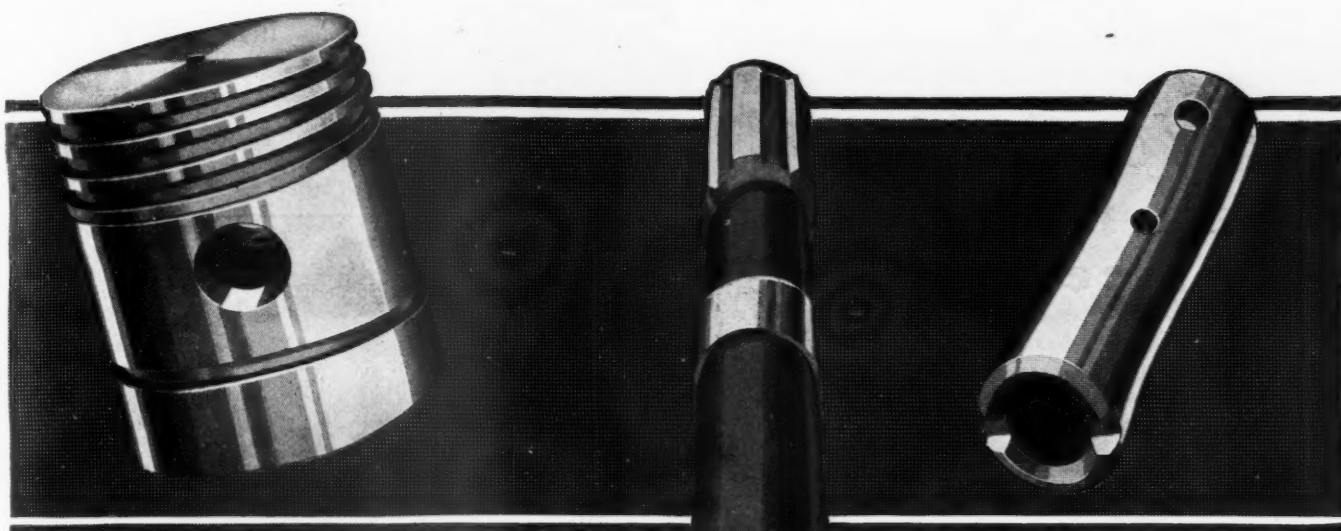
Our new pressed-steel separator DOES separate the balls; otherwise, it does LESS than any separator ever designed, including our famous Gurney solid-steel one.

"Separators Old and New" is a circular you should see; write for it.

Gurney Ball Bearing Co.
Jamestown, N. Y.

GURNEY

BALL BEARINGS



Let "Arrow Head" Be
Your Business Builder

"ARROW HEAD" is the
hallmark of Quality in
the manufacture of Pistons,
Piston Pins and Axle and
Drive Shafts.

It is our unalterable policy to
maintain this quality at its
present high standard and
ever be on the watch for new
methods, new material and
new machinery to refine and
improve it if possible.

ARROW HEAD STEEL PRODUCTS CO.
MINNEAPOLIS, MINNESOTA



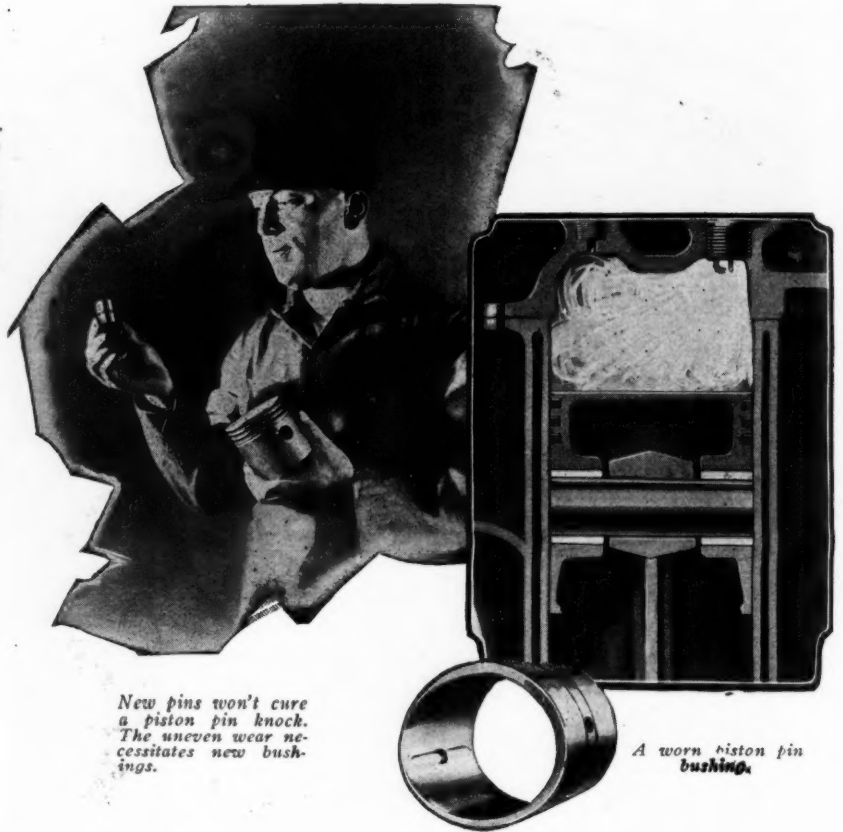
Arrow Head Products

The "Arrow Head" is Your Guarantee

Are You Cashing in on Bushing Replacement?



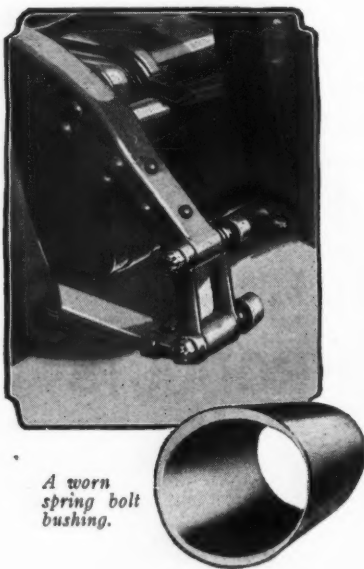
Bunting Automotive Bushings always fit. All are accurately and perfectly finished. All are made of genuine Bunting Phosphor Bronze.



New pins won't cure a piston pin knock. The uneven wear necessitates new bushings.

A worn piston pin bushing.

Examine a worn spring bolt bushing and you will see why nothing but new bushings will do.



A worn spring bolt bushing.

EVERY day dealers and service men are realizing more and more the value and size of the market for bushing replacement. Piston pin knocks and spring bolt rattles are among the most common and aggravating car troubles.

Nothing that costs so little, improves any car so much as new Bunting Bushings in pistons and springs. Our big national advertising campaign is

telling this to the car owner. Are you ready to supply Bunting Bushings?

Auto parts jobbers and repairmen, write for Stock List No. 18 showing Ready Made Piston Pin Bushings and Stock List No. 111 showing Spring Bolt Bushings to service all popular automotive vehicles.

CORED AND SOLID BARS of Bunting Phosphor Bronze in 31 stock sizes. Write for Stock List No. 3.



THE BUNTING BRASS & BRONZE CO. TOLEDO, OHIO

Branches and Warehouses at

NEW YORK
245 West 54th St.
Circle 0844

SAN FRANCISCO
198 Second St., Cor. Howard
Douglas 6245

CLEVELAND
710 St. Clair Ave., N. E.
Main 5991

BOSTON
36 Oliver St.
Main 8488

CHICAGO
722 So. Michigan Ave.
Wabash 9153

BUNTING BUSHING BEARINGS

PATENTED



Good Trucks With Attractive Bodies

Situated in the heart of a great lumber district, in Evansville, Ind., Graham Brothers body factory has a double advantage of the greatest importance to truck buyers.

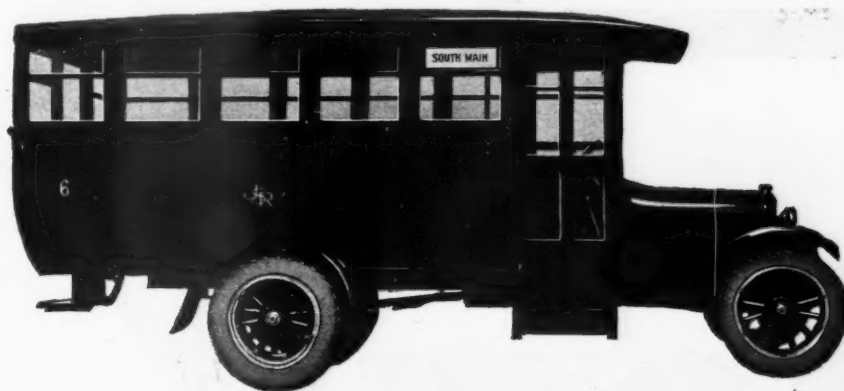
One is the low freight rate on raw materials, which is reflected in the low price of the bodies. The other is an unlimited first choice of the finest timbers, which is reflected in the quality.

The 30 standard body types which Graham Brothers are producing in steadily increasing numbers, meet the requirements of practically every line of business.

This means that you can buy a Graham Brothers Truck, complete, without the extra expense and inconvenience of ordering a chassis from one source and a body from another.

*1 Ton Chassis, \$1265; 1½ Ton, \$1325;
f. o. b. Detroit or Evansville, Ind.*

G R A H A M B R O T H E R S
D e t r o i t — E v a n s v i l l e



*One of a fleet of eight Graham Brothers Busses owned by the
Jamestown Street Railway Corporation, Jamestown, N. Y.*

GRAHAM BROTHERS TRUCKS

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE



Write for a copy of
"Mogul Alloys for Bet-
ter Bearings" or better
still, order a trial box
today.

Muzzy-Lyon Company,
Detroit, Michigan.

Gentlemen:

Regarding the Mogul bearings and bearing metal, all I have to say is, I have never in my past experience seen anything in the bearing line that would equal it.

I have had a good chance to try it out during the past six months testing this new Pikes Peak motor.

Again thanking you, I am

Ralph K. Mulford.

Ralph K. Mulford is an honored name in automobile racing history. He is known as a man whose long successful track record has been won not only by fearless, skillful driving but by an intimate technical knowledge of every detail of his mounts.

Accordingly, this statement of his regarding Mogul Bearings and Mogul bearing metal should command an unusual amount of respect.

"Mogul Alloy Genuine" special connecting rod metal, to which he refers, possesses a rare combination of qualities making it an ideal bearing metal.

It is easily poured without trouble from shrinkage or blow holes, and produces a bearing with a fine, closely-knit, even grain which will far outlast the average bearing alloy.

MUZZY - LYON CO., DETROIT, MICH.

Mogul

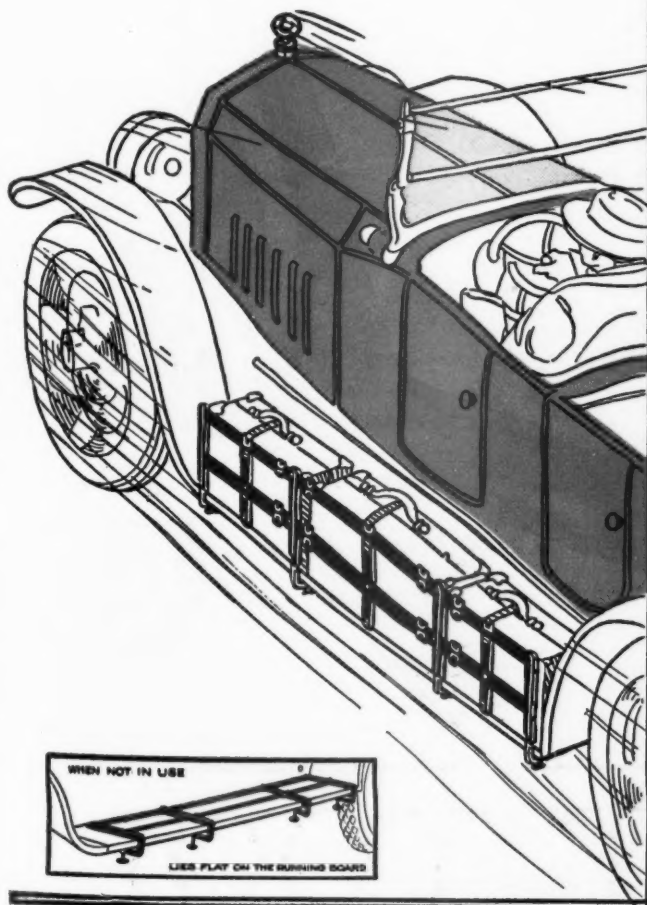
Engine Bearings and Bearing Alloys

MARQUETTE

LUGGAGE CARRIER

*Sold by Live Jobbers
and Dealers*

Dealers: Your jobber can make you an attractive proposition on the Marquette. Ask him.



WITH a Marquette you can enjoy all the conveniences of a luggage carrier, without the risk of marring the fine finish of your car.

The luggage is **strapped** to the carrier, and held fast, away from the body of the car. It can't bounce around and scratch the car, or get lost. Strong web straps, with a metal plate clamp, hold the baggage securely to the carrier.

When the Marquette is not in use it **folds right down flat on the running board**. There's no need to take it off or climb over it when not in use. Once installed it is always ready.

Neat appearance. Its trim straight lines conform to the lines of your car—enhancing its appearance.

Extra Strength. The Marquette is held by four big clamps to the running board. The uprights are made of special high-grade carbon steel—pressed into a channel shape that gives them tremendous strength. The cross bands are cut from flexible rolled steel that "gives" with bulging baggage but does not bend out of shape.

Fits any running board. Made in 2 sizes, both adjustable in length, 4 ft. and 5 ft. when extended. When set out to full capacity it adds 2½ inches in width to the baggage space. Easily attached without tools.

Every desired advantage—capacity, convenience, safety, strength—is to be had in the Marquette. It's a **quality** product—through and through.

MARQUETTE MFG. CO.

St. Paul, Minn.

For complete satisfaction—

Give them what they want

WHEN the purchaser of a new car finds it necessary later to add Crescent Tools in order to be adequately equipped, it means that his satisfaction with its original equipment is not 100% perfect. Dealers, as well as manufacturers, are finding that for complete customer satisfaction it pays to send out cars equipped with genuine Crescent Tools.

CRESCENT TOOL COMPANY

"The Crescent Wrench people"

Jamestown, N. Y.

The Crescent Kit, with 8-inch Crescent wrench, 6-inch thin straight nose pliers, and Crescent all steel screwdriver fits the side pocket and includes all the most-used tools. Retails for \$2.35. See advertisements in the Saturday Evening Post and other national publications.



CRESCENT TOOLS

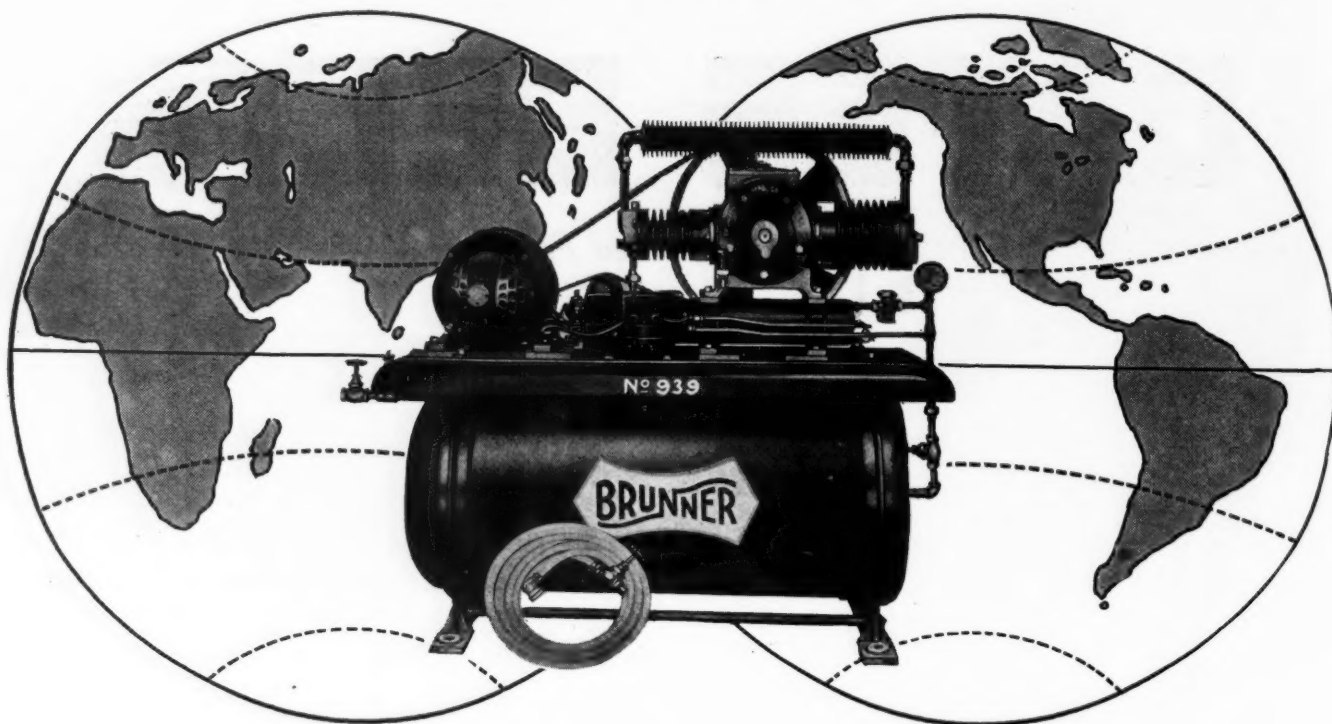
GATES BELTS

"The Standardized Fan Belt"

It's the elastic gripping qualities of the **bias weave** construction (patented) that gives Gates Vulco Belts a **positive grip** on the fan pulley.

Made by the World's Largest
Manufacturers of Fan Belts

BRUNNER
AIR COMPRESSORS



Known Around the World

No fear of getting an "orphan" when you buy a Brunner. It belongs to the Oldest and Largest Family in the Garage Air Compressor Field

6 Outstanding Features

1. Quick-Starting
2. Silent-Running
3. Long-Lasting
4. Speedy Air Delivery
5. Low Cost of Maintenance
6. Super-Safe

Brunners are used by dealers, garages and repairshops in every State in the Union, and in all motor car using countries throughout the world.

Brunner designed and manufactured the first garage air compressor ever made, and the new 1923 Brunner line represents the very latest developments in automotive air service.

The Brunner Compressor has 20 Exclusive Features.

Brunner attachments, parts, hose,

double-tested tanks, and other air service supplies, are of similar high character and proved dependability.

You can safely put your trust in a machine that is so universally standard the world over, so widely sold by leading jobbers, and so soundly established in every respect.

Write for new literature telling how to make your air service most profitable.

BRUNNER MANUFACTURING CO., UTICA, N. Y.

Oldest and Largest Manufacturers of Garage Air Compressors in the World.

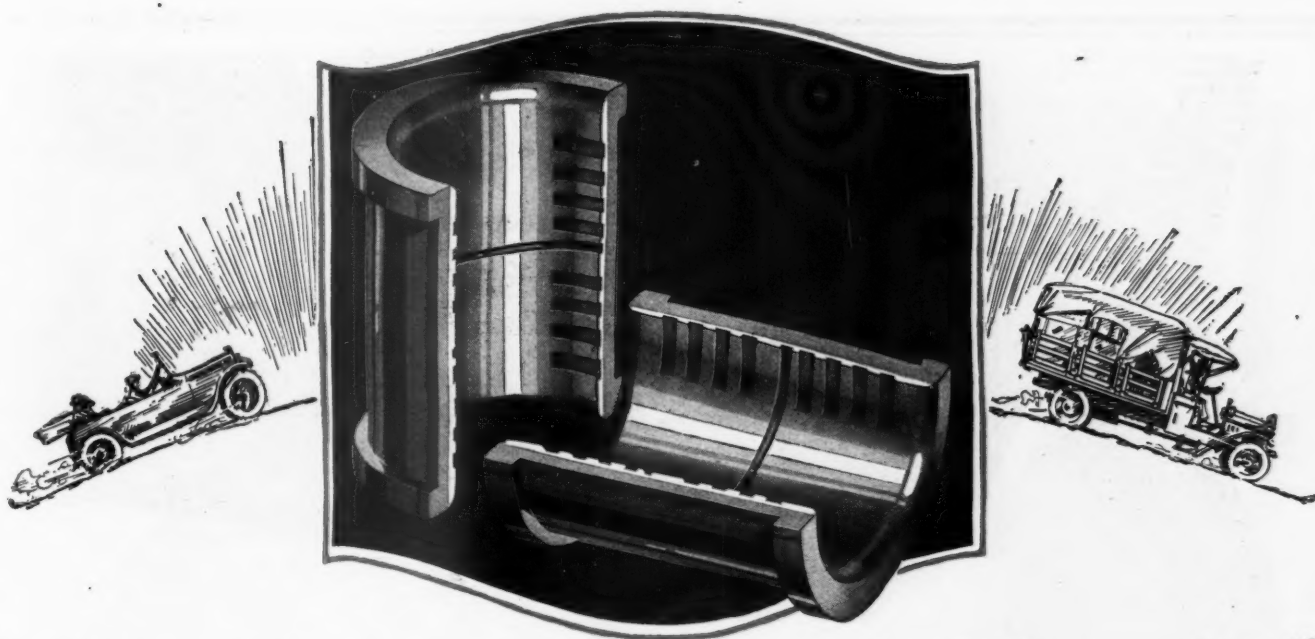
Sales Offices:

Cincinnati, Kansas City, San Francisco and nearly every Jobber from Coast to Coast.

Good for Twenty

BRUNNER
AIR COMPRESSORS

Years at Hard Labor



"I'm from a Famous Family"

"I'LL be put to work, like a blind mine mule—down in the dim oiliness of some crankcase — out o' sight, out o' mind.

"And what a life it'll be — no better, no worse than tens of thousands of my family have faced before me without a knock — but mighty strenuous for all that!

"One! Two! Three! Yes—five thousand times a minute the smashing blows of a ton apiece will spend themselves upon me as I turn the thrust of the shuttling pistons.

"A job? Yes — a 'he' job — but I'll come through! Back in Milwaukee I faced the all-feeling micrometer ten times before they let me bear the family name.

"I'm resting now, in this stock room, all labeled and waiting. But it won't be for long.

"What did I tell you — here comes my boss now! Someone's sent a hurry up call for me. And I won't disgrace the family—never fear!"

MILWAUKEE DIE CASTING CO., Milwaukee, Wis.



Milwaukee Bearings are carried in stock—ready for instant shipping — at over 400 distributing points throughout the country. Treat yourself to this great bearing service.

Write today for this handy bearing guide which lists cars, trucks and tractors with stock numbers for each. We will give you name and address of distributor near you.

MILWAUKEE BEARINGS



CARLOAD BUSINESS The Reward of Quality

Murray
"NOT A
WORRY" **TIRES**
FULL OVERSIZE

have been **QUALITY** tires from the beginning. Never for a single moment did we hesitate or debate whether to build a price or a quality product. We knew that the time would come when motorists would rue their "price bargains" and shun those tires and dealers who had disappointed them.

MURRAY TIRES are now reaping their just reward—and so are Murray dealers. Even during the past year—when price competition was the order of the day—we were forced to run our factories 24 hours each day to meet the demand.

We are now ready to fill the orders of new dealers who want to take advantage of the reputation **Murray Tires** have made—and warranted.

1923 IS A **QUALITY YEAR.**

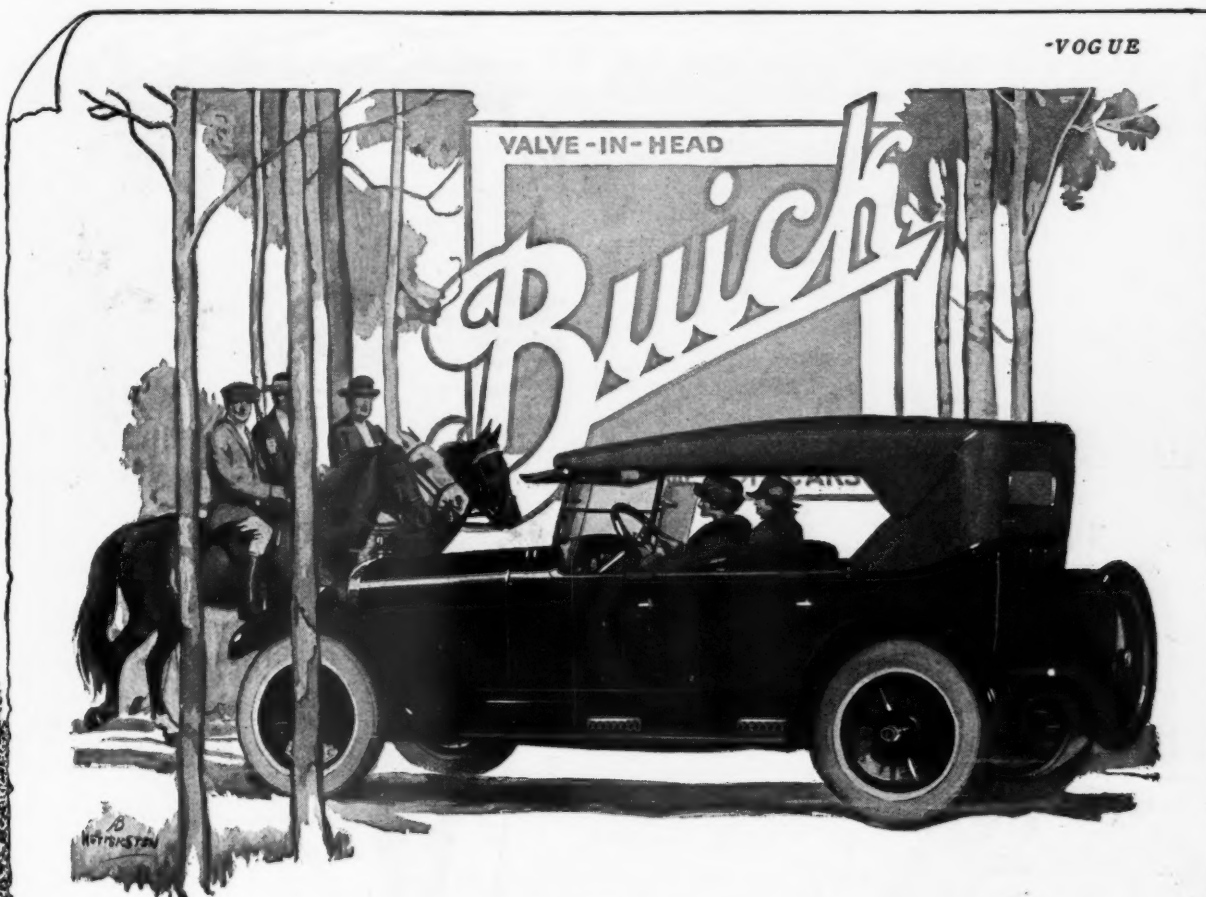
*Every Murray Tire
a Sou'-Easter*

Made and tested for the south-east wheel, where the traffic is roughest. The reinforcement on the side walls gives "truck-tire" strength where the strain is hardest.

*Write Dept. 1307 for our
Exclusive Dealers' Proposition*

Be the sole distributor in your community for this quality profit-bearing tire. We will be glad to discuss our distribution plan with dealers and show you how we can sell such a good tire at such a low price.

MURRAY
RUBBER COMPANY
TRENTON, N. J.



Reflecting the Spirit of the Out-of-Doors

What woman who loves the great out-of-doors does not thrill when flashing along the road in a Buick Sport Touring Car. For it is something more to her than merely a wonderfully fine automobile. Unconsciously, she thinks of it as a cherished outing companion, responsive both to mood and occasion.

Nor are its distinctive appearance, dashing beauty and spirited performance the sole reasons for her

Buick Dealers Have Many Women Customers

Each year Buick dealers are selling an increasingly large number of cars to women. So completely does Buick suit a woman's requirements that it is almost invariably her choice. Here is extra opportunity for Buick dealers. Why not have your name on file?

BUICK MOTOR COMPANY, FLINT, MICHIGAN
Division of General Motors Corporation

Pioneer Builders of
Valve-in-Head Motor Cars



Branches in All
Principal Cities

CASPER F. STEINMETZ

Started 1864

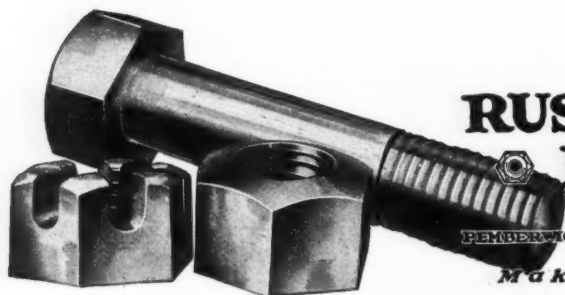
59 Years

With Russell, Burdsall & Ward



A Significant Fact
The "more-than-thirty-years" honor roll at the Russell, Burdsall & Ward plants now contains 82 names

ONLY the inspiration of the veteran's pride in his craftsmanship can invariably produce the high standards of quality which are traditional in the plants where Empire bolts are manufactured.



RUSSELL, BURDSALL & WARD
BOLT & NUT COMPANY

PORT CHESTER, N.Y.

PEMBROKE, CONN.

CHICAGO

SAN FRANCISCO

ROCK FALLS, ILL.

Makers of Bolts, Nuts and Rivets Since 1845

EMPIRE BOLTS

Don't Judge the Duesenberg Franchise By the Size of Your Town

We are not attempting to identify the DUESENBERG as an exclusively small town car, but we would like to impress dealers in the smaller towns with the fact that there is a sound, logical market in their communities for such a car.

A man does not have to live in a large city to appreciate of what fine stuff a car must be built to enable it to perform so marvelously. Though capable of far more speed than the owner will use, its speed may be regarded as the measure of its quality—the meter by which its excellence is critically judged by its makers. It must pass the world's most rigid performance tests before it leaves the factory.

In practically every town are men and women who long for just such a car as the DUESENBERG. The best proof of this is in the fact that DUESENBERGS are actually being sold in many of the smaller cities.

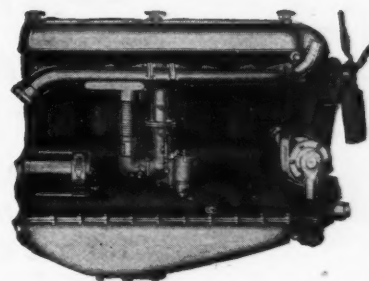
Don't hesitate about investment in demonstrators. We have something interesting to say on this point. A letter from you will bring full details.

DUESENBERG

AUTOMOBILE & MOTORS Co., INC.

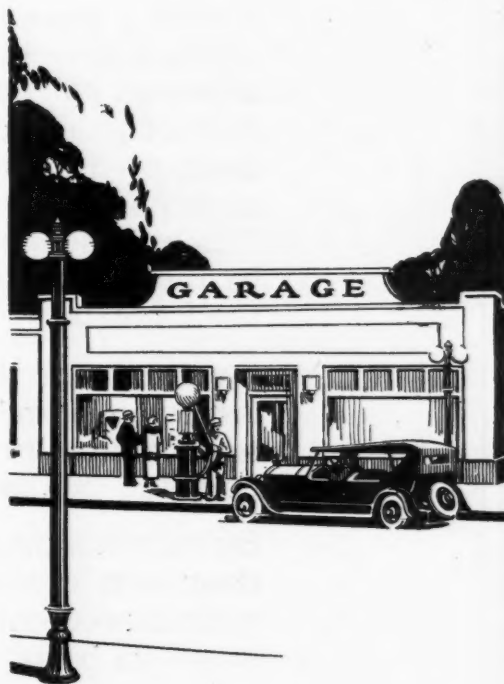
INDIANAPOLIS

INDIANA



The Original Straight-Eight

DUESENBERG'S Straight-Eight won the Grand Prix in 1921. For more than two years it has been the only straight-eight on the American market. Others will follow is the rumor. Ours has been refined, tested and proved. It remains the one proved design and the best example of engineering practice with overhead camshaft and valves. Most power per cubic inch of piston displacement.



DUESENBERG

The Original Straight-Eight
With Four Wheel HYDRAULIC Brakes

THE A. B. C. —An Aid to Advertisers *Both Local and National*

THE Audit Bureau of Circulations is an Association of publishers, advertisers and advertising agencies who are co-operating to standardize and verify circulation data, and thus place the buying of space on a basis of "Known Value."

The Bureau was established in 1914 and now numbers among its members the majority of the leaders in the publishing and advertising fields of the United States and Canada.

Twice a year the publisher makes a report to the Bureau showing total circulation and details of distribution by states, cities, towns, suburbs and rural districts; also subscription rates and facts about contests, premiums and club offers. Once a year these statements are audited by one of the Bureau's experts. The publisher-members agree to permit examination by the Auditor of all records considered necessary by the Bureau.

By means of the A. B. C. audit reports, which are issued on all member-publications, the advertiser can analyze the circulation of a publication and determine its value to him as an advertising medium.

By patronizing A. B. C. publications, advertisers guard their own interests and also participate in this nationwide movement to place advertising on a sound, business-like basis.

*MOTOR AGE is a member of the A. B. C.
and would be pleased to submit a
copy of the latest circulation report*

INVEST YOUR ADVERTISING DOLLARS BY USING A. B. C. PAPERS



Building a Business

Haven't you marveled just a little that Durant and Star Cars have so quickly become established?

You see them everywhere you go. Ten months ago not a Star Car had been placed in the hands of an owner. Now more than 70,000 are in service.

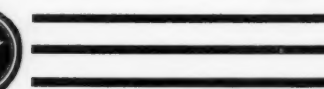
Twenty-two months ago the Durant Car existed in engineering form. Now more than 70,000 are in the hands of owners.

The progress of Durant Motors since its first product was exhibited in August, 1921, has emphasized that a good product and a good name are invaluable assets in building a business.

That is one reason why Durant merchandisers regard their Durant and Star Car selling franchises as the most valuable they have ever had.

DURANT MOTORS, INC., LONG ISLAND CITY, N. Y.

General Sales Department



BUILDING WRENCH SALES—and PROFITS!

Is your wrench and tool business showing a good profit? Are you handling a line that makes it possible to turn every prospect into a sale?

If not, you owe it to your business to investigate MOSSBERG Wrenches and the "All-Mossberg" plan today.

A superior line of wrenches and tools at a moderate price—a quick turnover—well balanced assortments to aid selling—a complete line—and unusual co-operation in the way of sales helps—you get all these—and better business—when you deal with Mossberg.

SPEED BRACES

Mossberg Speed Braces with the famous "Double Strength" construction are efficient, sensible tools which handle the most difficult job with ease. Like all Mossberg Wrenches and Tools they are made of high grade chrome steel. The dealer will find these Speed Brace Socket Wrenches fast sellers—in sets and individually. "Silent Salesman" "2510" features these wrenches, together with "Tee" handle and offset socket wrenches.

"EVER-WEAR" SOCKET WRENCHES

Mossberg "Ever-Wear" sockets are built to obtain the maximum amount of strength in socket wrenches. Note the round shape of socket giving added thickness. They carry, in addition to the regular Mossberg guarantee, further assurance that they will withstand the most exacting work.

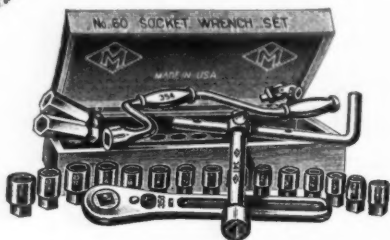
We illustrate here the No. 60 "Ever-Wear" Socket Wrench Set containing wrenches and sockets for every possible type of repair and assembly work.

TOOLS FOR FORDS

A wrench or tool for every conceivable nut or bolt—for every kind of Ford repair work—is found in the Mossberg line of Tools for Fords. The Ford owner is your best wrench prospect. The Ford Tools are sold in sets or individually. The 600 "Salesman" contains a well balanced assortment of these popular tools. Like other Mossberg "Silent Salesmen" it helps you move your stock of wrenches.



Write for catalog and complete information today



EVER-WEAR SOCKET SET NO. 60

MOSSBERG CHROME MANGANESE STEEL WRENCHES and TOOLS



"The hardest work needs Mossberg Wrenches"

FRANK MOSSBERG CO.

Lamb Street

Attleboro, Mass., U. S. A.

BRANCH OFFICES

Chicago, Ill.—180 N. Market Street
Los Angeles, Cal.—5005 Cimaron Street
Dallas, Texas—1129 N. Beckley Avenue
Seattle, Wash.—214 Maritime Building
Montreal, Que.—Office 21 Mt. Royal Hotel

FOREIGN SALES OFFICE
461 8th Ave., New York City

Selling trucks and buses is easier when you know the owner's viewpoint

Read Motor Transport

It tells you the problems of the Fleet Owner. It tells you how Fleet Owners are making and can make a success of truck or bus operation.

Just as *Motor Age* tells you how to handle your business, so *Motor Transport* tells how to efficiently operate fleets of motor trucks and buses.

Reading *Motor Transport* will make you a better dealer.

Recommend fleet owners to whom you have sold trucks or buses to subscribe for *Motor Transport*. This magazine will make them more efficient operators.

You will both benefit!

Motor Transport is published semi-monthly, on the 1st and 15th. The subscription price is \$2.00 per year (\$2.50 West of the Mississippi).

Write for a sample copy.

Motor Transport

FORMERLY COMMERCIAL VEHICLE

(Published by the Class Journal Co.)

239 West 39th St. New York, N. Y.

Nowadays Car Owners Know Carburetors



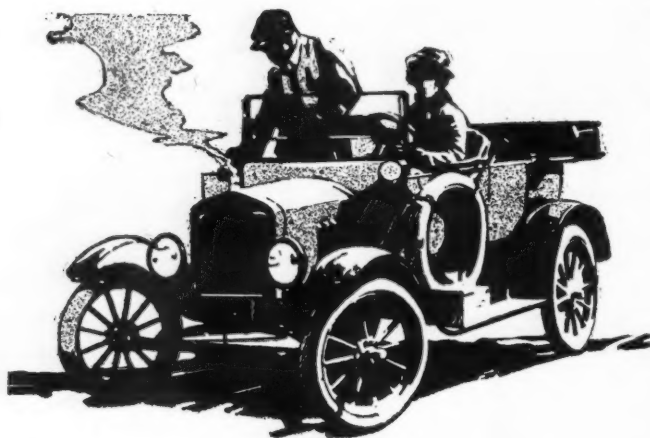
Car owners have discovered that frequent carburetor adjustments do not solve the short-mileage problem. Their neighbors' cars are delivering twenty miles and more to the gallon with no carburetor tinkering. They find that their neighbor's carburetor is the new, non-air-valve Tillotson. More and more obsolete, old style carburetors are being replaced by the new Tillotson every day.

More than a million Tillotsons are now in use. One out of every twelve cars in your county is Tillotson-equipped. This is your service field. The replacement field is unlimited for this new, more economical carburetor. Liberal discounts make Tillotson sales and service very profitable.

Write us. We will advise you at once if the Tillotson franchise for your territory is open.

TILLOTSON MANUFACTURING CO. • TOLEDO

Tillotson
CARBURETOR



Prevents motor overheating

STEADY driving in the sweltering heat causes Fords often to overheat—fatigue. This condition is brought on by incomplete gas vaporization—an over-rich mixture.

An overheated motor and its attendant ills are always to be guarded against. The Krafve Mixer Intake Manifold will do the guarding—automatically.

Show the Krafve Manifold to your Ford customers. Explain how its flattened construction permits of freer circulation and more thorough mixture. No sluggishness—(no matter how poor the fuel)—no difficult starting—no slow pick-up—no gas and oil waste—no dangerous overheating.

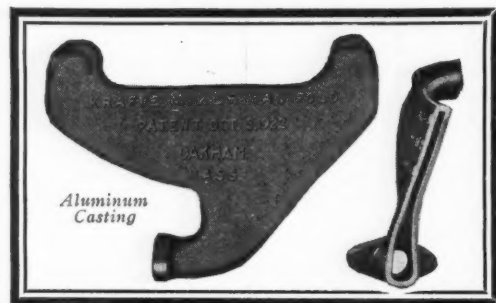
These are not claims merely! **TEST** a Krafve on your service car and you'll be sold on its merits.

Sells for \$5 with installation. Generous dealer profit.

Easily installed by bolting carburetor to Krafve with same bolts and nuts and clamping on cylinder in same position.

*Dealers, Jobbers: Write
for sales proposition*

Krafve Automotive Corp.
Oakham, Mass.



KRAFVE

Ford Mixer Intake Manifold

Stop Him!

Get an automobile driver to stop at your curb and you can sell him gas, or oil, or plugs, or a spotlight, or a battery, or something. Make him stop and it means business.

A Franklin Air and Water Station will stop him! Here's a clean, quick and convenient way for your customer to get air for his tires and water for his radiator. The Franklin outfit attracts attention—and it brings business.

Comes in grey and black, electrically wired with a light socket in the head, stands 12 feet 6 inches over all. A long air hose that reaches two cars, the hose-arm carefully counterbalanced to drop back into position, no springs to rust or lose tension, the water flow controlled by a non-corrosive brass valve.

Don't miss your chance for more business. Order a Franklin Air and Water Station today from your jobber, or write us.



\$58⁵⁰ f. o. b.
Norristown

Franklin
Air Compressor Works

2604 Main Street
Norristown, Pennsylvania

Manufacturers of the Franklin Air Compressor

1

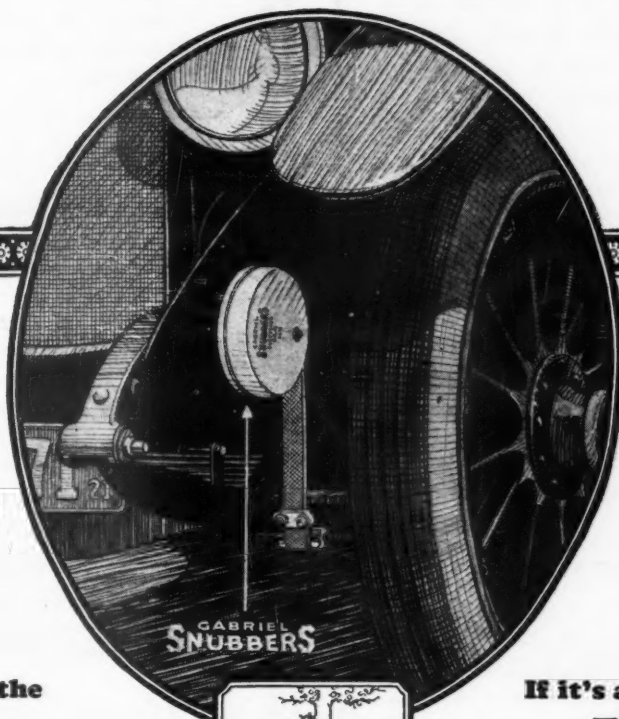
"Gabriel" is the only Snubber—
there is no other. Over 4 million
in use. 37 cars standard-equipped
—manufacturers of 34 others put
holes in frame for them. How can
you afford to be without them?

Sold by legitimate dealers

GABRIEL MANUFACTURING CO.
1415 East 40th Street Cleveland, Ohio

GABRIEL SNUBBERS

THERE IS NO OTHER



**Keep You on the
Seat
Save Your Car**



**If it's a Snubber
—it's a
"GABRIEL"**

WARNING!

To Manufacturers and Sellers
of
**BAR
RADIATOR CAPS**

Both Lock Type and Plain



This Design Is Patented

The type of radiator cap illustrated above is fully protected by Design Patent No. 56,698 owned by the White Products Company of Chicago, Illinois. No one but a licensed manufacturer has the right to make and sell caps of this design and unless your caps are purchased of a licensed manufacturer you are liable to a suit for infringement and the payment of a heavy penalty. A suit on this patent against an unlicensed manufacturer is now pending in the United States District Court.

To accommodate the purchasing public and to insure satisfactory distribution of caps as illustrated above (Both lock type and plain) the White Products has licensed a number of manufacturers to manufacture and distribute bar radiator caps. A partial list of manufacturers so licensed are as follows—

Gladiator Mfg. Co., Auburn, Ind.

The Norlipp Co., Chicago, Ill.

The Illinois Die Casting Mfg. Co.,
Chicago, Illinois

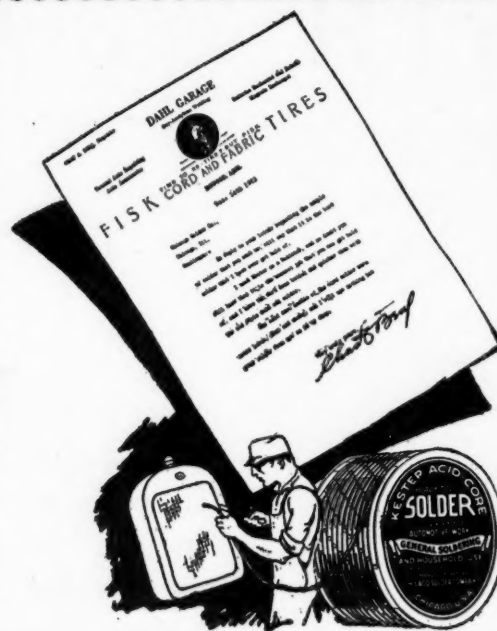
The S. H. Thomson Manufacturing
Co., Dayton, Ohio

WHITE PRODUCTS CO.

100 W. 55th Street

Chicago, Illinois

INFRINGEMENTS ARE BEING PROSECUTED



"The Meanest Job"

Chas. A. Beal, proprietor of the Dahl Garage, is right when he says—here it is—read it yourself:

"I used Kester on a radiator, and no doubt, you will know that it is the meanest job that you can get hold of, and I have the work done better and quicker than with the old-style acid and solder. The acid cores inside of the wire solder sure saves labor, time and money, and I will use nothing but your solder from now on in my shop."

We all agree with him, a radiator is a mean job and he's found how to simplify soldering it—Kester does the work.

Sold by live dealers everywhere in one pound coils, in cartons, and on one, five and ten pound spools

Manufacturers

CHICAGO SOLDER COMPANY

4203 Wrightwood Avenue, Chicago

Direct Factory Representatives:

THE FAUCETTE HUSTON CO.

Chattanooga, Tenn.

LOUIS J. ZIESEL CO.

216 Market St.
San Francisco, Cal.

DAVIES-ELY CO.

66 W. Broadway
New York City

KESTER
Acid Core WIRE SOLDER



Requires Only Heat

A New Plan for Speeding Up Your Sales of

Farran-oid FAN BELTS

Five Special Assortments

For Distributors of

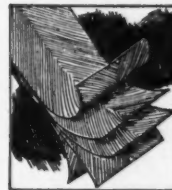
**Buick, Studebaker, Overland,
Willys-Knight, Dodge, Ford**

DO you find it difficult to select a well balanced fan belt stock—one that will give you quick turnover, hold down your stock investment, and eliminate the unprofitable items?

The Farran-oid special assortments will solve that problem for you. The assortments are carefully selected to meet the individual dealers' needs—a practical stock that gives you the longest discount and maximum re-sale profit. Each assortment is packed in a standardized shipping container, including a liberal supply of Farran-oid literature.

Remember also that Farran-oid Fan Belts are interchangeable; each assortment will service many other cars than those for which it is specifically intended.

These standard assortments will simplify your Fan Belt buying; ask your jobber about them.



**Two Sturdy
Types**



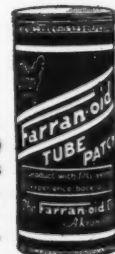
**They Won't Slip—
They Won't Stretch**

The Farran-oid Flat Endless Belt is built upon a foundation of specially woven herring-bone tape that gives it maximum gripping qualities; no adjustments or service requirements.

The Farran-oid Cable V Type Belt is built around an endless twisted stretchproof core—not cords, but a twisted cable. The patented hollow crown permits the belt to expand and hug the pulley; it will not slip when applied loosely.

Farran-oid Tube Patch

An excellent new Farran-oid product that is breaking sales records. Ask your Farran-oid jobber about it.



Three sizes—
50c and \$1.00
Buffer top cans
for motorists;
large size can
for garage use.

The Farran-oid Co.

Akron, Ohio

<p>No. 1</p> <p>FARRAN-OID FORD ASSORT- MENT</p> <p>CONTAINS</p> <table><tr><th>Quantity</th><th>Car Model</th></tr><tr><td>10</td><td>1911-16</td></tr><tr><td>40</td><td>1917-20</td></tr><tr><td>50</td><td>1921-23</td></tr><tr><td colspan="2">Weight 15 Pounds</td></tr></table> <p>Dealer's Profit, \$28.80</p>	Quantity	Car Model	10	1911-16	40	1917-20	50	1921-23	Weight 15 Pounds		<p>No. 2</p> <p>FARRAN-OID DODGE ASSORT- MENT</p> <p>CONTAINS</p> <table><tr><th>Quantity</th><th>Car Model</th></tr><tr><td>10</td><td>1915-16</td></tr><tr><td>50</td><td>1917-22</td></tr><tr><td>40</td><td>Late 1922-23</td></tr><tr><td colspan="2">Weight 17 Pounds</td></tr></table> <p>Dealer's Profit, \$40.50</p>	Quantity	Car Model	10	1915-16	50	1917-22	40	Late 1922-23	Weight 17 Pounds		<p>No. 3</p> <p>FARRAN-OID BUICK ASSORT- MENT</p> <p>CONTAINS</p> <table><tr><th>Quan.</th><th>Car Model</th></tr><tr><td>20</td><td>E 44 to 50; H&K 44 to 50</td></tr><tr><td>20</td><td>D 44 & 45; E 34 & 35</td></tr><tr><td>10</td><td>D 36 & 37; D 54 & 55</td></tr><tr><td>50</td><td>21, 22, 44 to 50; 22, 34, 35, 36, 37</td></tr><tr><td>1</td><td>F-36 Gratis (C-24, 25)</td></tr><tr><td colspan="2">Weight 16 Pounds</td></tr></table> <p>Dealer's Profit, \$41.02</p>	Quan.	Car Model	20	E 44 to 50; H&K 44 to 50	20	D 44 & 45; E 34 & 35	10	D 36 & 37; D 54 & 55	50	21, 22, 44 to 50; 22, 34, 35, 36, 37	1	F-36 Gratis (C-24, 25)	Weight 16 Pounds		<p>No. 4</p> <p>FARRAN-OID OVERLAND & WILLYS- KNIGHT ASSORT- MENT</p> <p>CONTAINS</p> <table><tr><th>Quan.</th><th>Car Model</th></tr><tr><td>10</td><td>O. 83B, 83, BOE, 85-4, 90B, 90T, late</td></tr><tr><td>20</td><td>O. 80, 81, 83</td></tr><tr><td>30</td><td>O. "4"</td></tr><tr><td>10</td><td>WK. 84, 88-4, 048</td></tr><tr><td>10</td><td>WK. 20A</td></tr><tr><td>20</td><td>WK. 20</td></tr><tr><td>1</td><td>M-111 Gratis (O. 85, 86)</td></tr><tr><td colspan="2">Weight 18 Pounds</td></tr></table> <p>Dealer's Profit, \$45.97</p>	Quan.	Car Model	10	O. 83B, 83, BOE, 85-4, 90B, 90T, late	20	O. 80, 81, 83	30	O. "4"	10	WK. 84, 88-4, 048	10	WK. 20A	20	WK. 20	1	M-111 Gratis (O. 85, 86)	Weight 18 Pounds		<p>No. 5</p> <p>FARRAN-OID STUDEBAKER ASSORT- MENT</p> <p>CONTAINS</p> <table><tr><th>Quan.</th><th>Car Model</th></tr><tr><td>10</td><td>ED, SF, EH, SH</td></tr><tr><td>30</td><td>Light Six, 1919-23</td></tr><tr><td>30</td><td>Big Six, Sp. Six, 1919-21</td></tr><tr><td>30</td><td>Big Six, Sp. Six, 1922-23</td></tr><tr><td colspan="2">Weight 15 Pounds</td></tr></table> <p>Dealer's Profit, \$40.50</p>	Quan.	Car Model	10	ED, SF, EH, SH	30	Light Six, 1919-23	30	Big Six, Sp. Six, 1919-21	30	Big Six, Sp. Six, 1922-23	Weight 15 Pounds	
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30	Light Six, 1919-23																																																																			
30	Big Six, Sp. Six, 1919-21																																																																			
30	Big Six, Sp. Six, 1922-23																																																																			
Weight 15 Pounds																																																																				



"If I'd Only Bought That Autowline!"

Picture a muddy country road, miles from town—your car is deeply mired in a ditch—and on top of that it starts to rain! Finally you have hope—you hear another car approach—you stop it—but no use; its driver left his Basline Autowline at home. And you have always put off buying one!

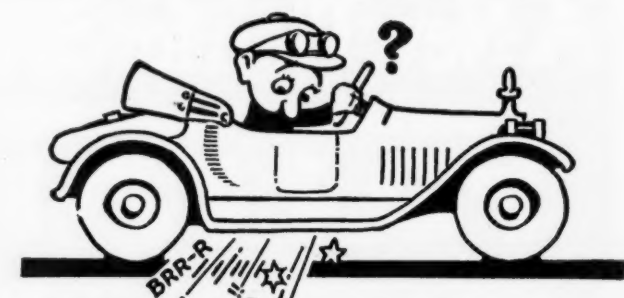
Don't wait until such a situation actually *does* happen; safeguard against emergencies by getting a Basline Autowline at once. Then carry it with you at all times; it weighs only several pounds, and fits under your seat cushion. It's the "Little Steel Rope with the Big Pull."

Basline Autowline is made of world-famous Yellow Strand Wire Rope. Insist on getting this *original* wire rope towline. Snaps on instantly and securely with patented Snaffle Hooks. Only \$4.95, east of the Rockies.

MONEY FOR JOBBERS AND DEALERS:

Basline Autowline pays you a good profit, it sells well, and is the **ONLY** Nationally-Advertised towline on the market. Push it this season.

BRODERICK & BASCOM ROPE CO.
ST. LOUIS — NEW YORK



WHAT'S WRONG in This Picture?

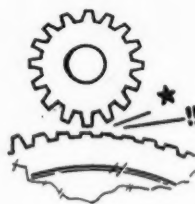
BR-RRR! BRR-RR!

He steps on the starter again.

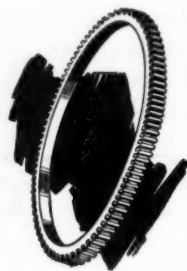
BRR-RRRR!!!

What's wrong?

Simply a stripped fly-wheel. Starter pinion won't catch hold.



The thing to do is to install a new gear band. Another fly-wheel would soon become chipped and battered again. A steel gear—Huetter's, of course—means a job of everlasting satisfaction. Costs less, too, than a new fly-wheel, and there's no delay in getting the shipment.



Huetter Gear teeth are machined to Bendix Drive specifications. When you install a Huetter Gear of hard, tough steel, you *know* you have a gear that will give easy, quiet, positive meshing as long as the car lasts.

Convenient location of distributors assures a speedy delivery. Order direct, or from your nearest jobber.

Huetter's

Fly-Wheel GearBands

Manufactured only by

HUETTER MACHINE & TOOL CO.

538 Kentucky Ave.
INDIANAPOLIS



On Steering Knuckles

Are you having trouble in rebushing steering knuckles? This is a ticklish job at the best. Just a few thousandths play and a bad rattle develops. In other words, unless the bushings are reamed accurately, you have a dissatisfied customer.

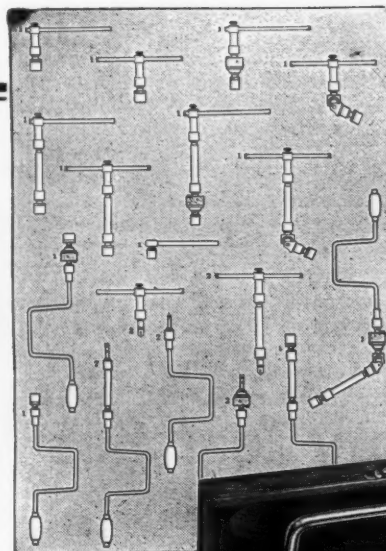
This is just the job for

Quick-Set *Adjustable Reamer*

Quick-Set gives you accuracy—accuracy in manufacture and in reaming. This reamer is designed to cut on all six blades, and when, after long hard service, new blades become necessary you may replace the blades at a minimum of expense. The old Quick-Set goes back on the job practically as good as new. No grinding or fussing. The blades *fit*, for they are made right.

Order a set of Quick-Set today from your dealer. But be sure you obtain genuine Quick-Set reamers—made only by

The **CLEVELAND** TWIST DRILL COMPANY
CLEVELAND NEW YORK-CHICAGO-LONDON
TRADE MARK REG. IN U. S. AND FOREIGN COUNTRIES



1—Ten of these
2—Two of these

H & G
Universal Set complete with Speed Wrench



140 combinations

all in this ONE set

Mechanic's Dream Comes True

THE H & G Universal Socket Set complete with Speed Wrench takes the place of a wheelbarrow full of single-purpose tools.

In this set you have everything you need in the way of a wrench. You take it with you from car to car. No time is wasted trying to find the proper wrench.

The application is rapid and natural. The nut to be loosened or tightened determines the socket to be used, which is done at a glance. Its location determines what attachments are required, and they are instantly snapped on and the job is done.

Easy, simple, quick, practical—the better way.

* * *

The Sockets, which are the heart of any set, are stronger, and permit the mechanic to use his strength. They are cold-drawn from bar stock by the Allen Process and are specially heat-treated. Just the right thickness to combine proper margin of safety in strength and still be thin enough to be used everywhere.

Superior in design, strength and workmanship, this set of wrenches will save your time and temper because it is a real tool for real mechanics.

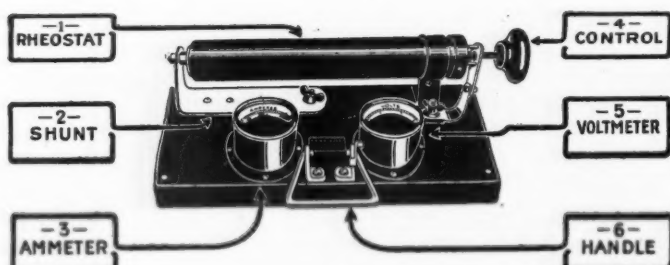
Ask your dealer. Write for literature.

The Eastern Machine Screw Corporation
10-20 Barclay St., New Haven, Conn.

Socket



Wrench



6 Reasons for Selecting the Allen-Bradley Battery Test Set

1 THE RHEOSTAT is of the graphite compression type, completely enclosed in a steel tube, and practically indestructible. No battery test set will stand the service, acid fumes or overload like the graphite disc rheostat in this test set.

2 THE SHUNT is part of the instrument and likewise indestructible. Its capacity is well over 300 amperes and can be used for testing starter current or other discharges up to 300 amperes.

3 THE AMMETER is rugged and built for abusive service. It is easy reading, reliable, and conveniently placed.

4 THE CONTROL is simple, with a wheel which regulates the discharge from nothing to 300 amperes with stepless control and without contactors. Acid fumes do not affect it and corrosion is unknown in graphite discs.

5 THE VOLTMETER together with convenient test prods furnished with the instrument and also the Allen-Bradley battery test chart tell the whole story about the battery at a glance and without question on the part of the customer.

6 THE HANDLE makes the test set convenient and portable, an unusual feature in battery test sets. Take the test set to the battery and not the battery to the test set. Order your test set, today. Be up-to-date.

Allen-Bradley TYPE L-2502 HIGH-RATE DISCHARGE TEST SET

Allen-Bradley Co.

Electric Controlling Apparatus

281 Greenfield Avenue

Milwaukee, Wisconsin

We are looking for more information about a high-grade, medium-priced test set. Please send us, without obligation, full information about the Allen-Bradley test set and test chart.

Meilicke Signals

Check-Lite



Back Stop Model E

A Signal That Can Be Trusted

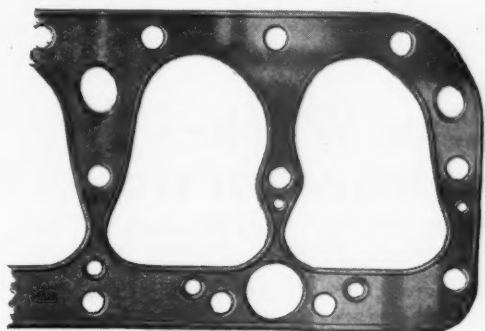
Trusted by the owner because it is guaranteed without reserve against fault of material and workmanship; because it tells instantly if broken wires or chafed insulation cause failure. Trusted by dealers because it is backed by an old house that intends to stay in business.

Backstop with tail light combines a powerful white light for backing with an unavoidable stop-signal and a standard-size tail light. It is only one of the complete MEILICKE line in which you can find a signal suitable for any prospect.

A signal system can only be as reliable as its weakest link. That is why we make our own brake switch.

Write your jobber now for discounts and illustrated description. There's money in it.

MEILICKE CALCULATOR CO.
944 WRIGHTWOOD AVE.
CHICAGO ILLINOIS



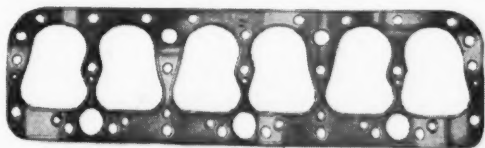
The edge that binds

It's the bound edge and scalloped corners of a Never-Leak Gasket that binds the customer to you.

A job mechanically "right" may be "powerfully" wrong if finished off with a poor gasket.

Day by Day in every way the car owner is getting wiser and wiser. Please him and keep him. Give him good replacement parts and you won't have to replace a customer.

NEVER-LEAK Gaskets can't blow out. They retain their life. They last longer. They keep the customer sold. That's where your profit comes in.



There is a NEVER-LEAK Gasket for every standard make of car, truck and tractor. A sample will be sent on request. NEVER-LEAK catalog gives detailed description of gaskets used on various cars, trucks and tractors. Send for it.

THE FITZGERALD MFG. CO.

Torrington, Conn.

NEVER-LEAK

Cylinder Head Gaskets



—that Small Unit with the BIG Responsibility

TUCKED away under the bonnet, the generator cutout is unseen and unknown as far as the average motorist is concerned. When it goes wrong and you replace it, your reputation demands a renewal unit of unquestioned dependability. Renew with the genuine



Generator Cutout

the cutout of absolute reliability. Hundreds of thousands of Basco Generator Cutouts are giving consistent, unfailing service on many varied makes of cars.

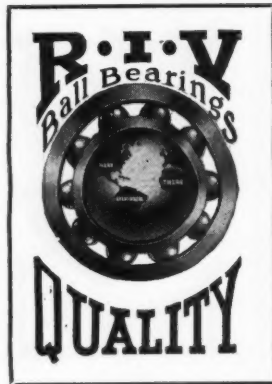
Embodying the experience, manufacturing knowledge and skilled workmanship that in 12 years have made Briggs & Stratton automotive electrical components standard equipment on a large percentage of the leading makes of cars and trucks, the Basco Generator Cutout is the ideal renewal unit. Write for name of nearest Basco distributor.

Heavy series winding; high resistance shunt coil; solid, riveted assembly; pure coin silver contacts; special bracket for Ford mounting; guaranteed to give complete satisfaction. List prices: No. 1655, 6-volt, 15-amp., \$2.00; No. 1441, 12-volt, 15-amp., \$2.55.



Briggs & Stratton Co.

Milwaukee, Wisconsin



Exact Italian Work— Precise American Service

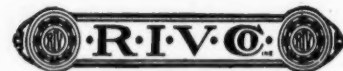
It is just as easy for you to get R. I. V. Ball Bearings as it is to get any domestic make.

R. I. V. Service Stations are located at all the "Key" cities in the country—and new, well-organized distributors are being appointed constantly. There's one near YOU!

Thus the unequalled quality of these wonderful bearings is brought right to your hand—there need be no waiting, no delay.

You can build a reputation for highest-class, unfailingly dependable service if you do business on the basis of quality. In ball bearings R. I. V. assures you of the HIGHEST quality.

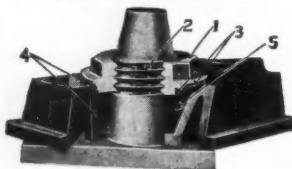
**R. I. V. Ball-Bearings—
the Peak of Quality**



1755 BROADWAY
NEW YORK CITY



Our Anchor Seal



- 1—Heavy Hexagon Nut.
- 2—Coarse Threads: Will not strip.
- 3—Flanges: Anchor post to cover.
- 4—Forced Fit.
- 5—Compound: Acid-proof seal.

This is an important feature
Exclusive in GENERAL batteries.

Look Out for the Battery That Steals Your Profit

DO you sell a battery with an *adjustment guarantee*? Every time it breaks down or fails to give good service it steals money from your original profit.

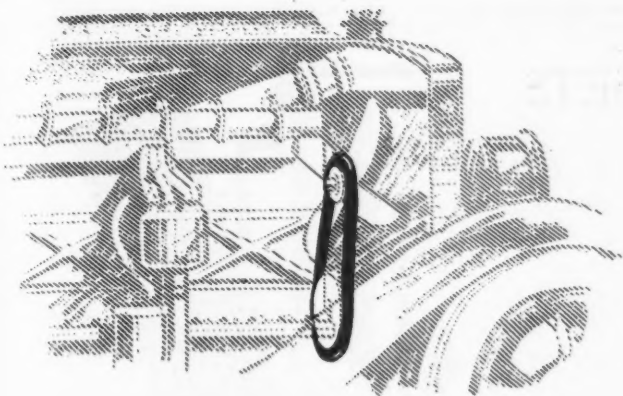
You don't have to make profit-eating adjustments when you sell the GENERAL battery. Our *ironclad* guarantee (not an *adjustment* guarantee) protects you against money loss, as well as protects your customer against expense.

You make a generous profit on the sale of the GENERAL battery. This profit goes into your bank account—and stays there.

*Some battery service stations make money and others don't.
Our free booklet "The Service Station Guarantee" tells why.
Write for it.*

General Storage Battery Co.

2005 Locust Street,
St. Louis, Mo.



Getting at Fan Belt Facts

It's not their fine looks, but their rugged in-built quality that has earned for Rie Nies their reputation to outlast all other fan belts.

Like a fine auto tire, built ply upon ply of bias woven, rubber saturated fabric, then sealed tight in its special Rie Nie cover jacket, finally vulcanized into one endless, stretchless unit—that's a Rie Nie Flat Fan Belt.

Rie Nie Vee-Rounds built this same careful way around a solid compound core that flattens out against the pulley sides with a grip of firmness that prevents their ever riding up over the pulley flange.

Whether Flat or Vee-Round, Rie Nie Fan Belts in their making are individually stretched so that they never lose their shape or change in size.



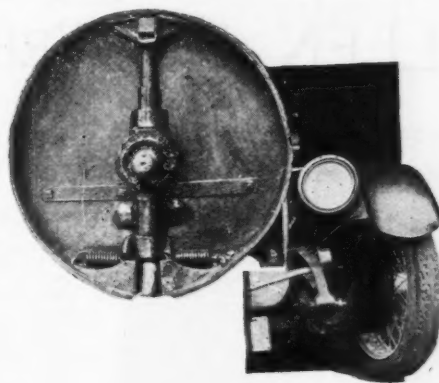
Dealers know Rie Nies for their rugged quality, and prefer them for their sales results from a smaller stock that fills all fan belt calls.

Ask your jobber—or write direct
Rie Nie Fan Belt Chart upon Request



FAN BELTS

DURKEE-ATWOOD
MINNEAPOLIS, MINN., U. S. A.



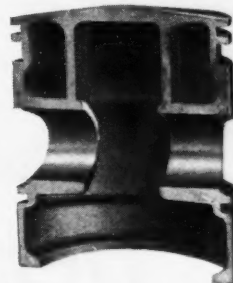
Green-Safety Front Wheel Brakes

Will make ANY MAKE of car as up-to-date as the new Packard Single Eight. Wonderful overhaul opportunity, as every motorist will want them installed.

Appeal to women-drivers especially. Stop any car in less than half the usual distance. Operate from regulation brake-pedal. **SAFE.** Positively no skid under any conditions.

Biggest overhaul opportunity in years. Big discounts to you. Don't delay on this, but send us your name **NOW.**

Aluminite Pistons



Wonderful combination of the right alloy and right design. Wear **FIVE TIMES** longer than die-cast pistons. Can't score, pump oil or slap. Used in 90% of the successful racing motors for the past nine years. Make fours perform like sixes. Special 12 oz. piston for racing **FORDS.** Used by the winner of Pikes Peak race. We also make Aluminite connecting rods.

High Speed Camshafts



Replacement camshafts for all makes of cars. Add speed and power by permitting an improved valve-lift. An absolute necessity for racing cars.

We are specialists in all kinds of racing units for all makes of cars. See us **FIRST.**

GREEN
ENGINEERING COMPANY
Dayton, Ohio

ALLEN (Bay State) WRENCH SETS



*with Allen-Process Sockets
— Guaranteed Unbreakable*

At left: Box Set No. 20, with 1 reversible ratchet or solid wrench; 1 offset wrench; 1 interchangeable speed wrench; 1 universal joint; 1 9 1/2" extension bar; 9 hexagon sockets and 8 square sockets. List price, \$15.00.

At right: Bag Set No. 21-1, with 8 hex. sockets; reversible ratchet wrench; universal joint; extension bar; bent bar; removable adapter; strong, serviceable bag. Price, \$7.00 (list).



No wrench set ever contained a *ratchet* so strong, so simple in design and compact in form as that which you get with an ALLEN Set. This (reversible) ratchet is only *one* of the features that go with the cold-drawn, unbreakable sockets—to make a wrench set that no user has ever worn out.

Box Sets and Bag Sets, made up to cover the maximum of wrench requirements with a minimum of tools. All described in the "Bay State" (ALLEN) booklet; copy sent if you'll send a word.

THE ALLEN MFG. COMPANY 135 Sheldon Street,
HARTFORD, CONN.

Pacific Coast Branch Office: The Charles A. Dowd Sales Co., 320 Market Street, San Francisco, Cal.

Chicago Distributor: J. V. McDowell, 6230 Ellis Avenue.

Southern Distributor: The Johnson Sales Co., 1429 Candler Bldg., Atlanta, Ga.

15 FEET OF I BEAM TRACK

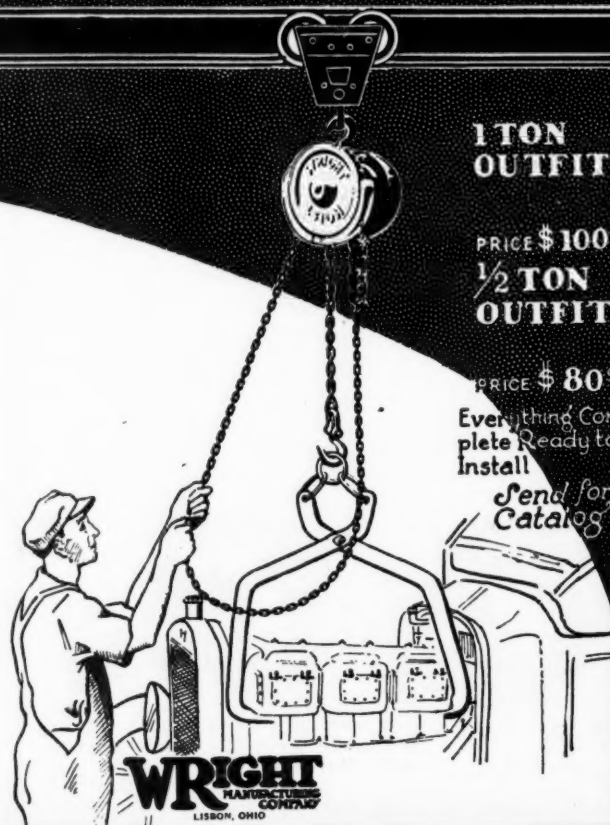
*Here it is
Just the Thing for
Your Shop*

DON'T—

Don't Fuss & Worry with Blocking up a Car
Don't Work Down in a Damp Pit
Don't Take Time to lift and
Then move the Car

**Hook her to a
WRIGHT**

**HIGH SPEED
HOISTING & CONVEYING OUTFIT**



**1 TON
OUTFIT**

PRICE \$100⁰⁰

**1/2 TON
OUTFIT**

PRICE \$80⁰⁰

Everything Com-
plete Ready to
Install

Send for
Catalog

WRIGHT
MANUFACTURING
COMPANY
LISBON, OHIO

Story of the TRUSKO Brace



A fact:

An item is known by the company it keeps. Among the Western distributors of the TRUSKO Brace are:—

CHANSOR & LYON Co.
WEINSTOCK-NICHOLS Co.
McCoy MOTOR SUPPLY Co.
E. A. FEATHERSTONE Co.
EVINS RUBBER Co.
REMICK & Co.
CALIFORNIA AUTO SUPPLY Co.

The **TRUSKO** *Brace*
for Fords

Special model for 1 ton worm drive truck

ends destructive vibration

Try This Just Once—

Send for a sample TRUSKO Brace.

Show the first Ford owner who comes into your store, how easily it is installed. How it supports the crank case and transmission. How it prevents broken crank case hanger arms and sagging of the rear crank case. How it cradles the vital parts of the car against road shocks.

Tell him it is absolutely guaranteed to do this. That it only costs \$2. That it will pay for itself a hundred times over. Then ask him to buy.

After that, you'll be cashing in on TRUSKO regularly.

The **TRUSKO** *Inc.*
NAPA, CALIFORNIA

(7)

Repairmen and Motor Owners Unanimously for the HEALD

THE REPAIRMEN choose the Heald for its economy in producing the highest grade of work. The Heald Universal Jig permits quick set-ups and accurate location of the cylinder bloc regardless of size or type. Simplicity of control eliminates lost motion and accurately graduated dials supplant guesswork. Every factor for cutting time from floor to floor is incorporated in the design and the minutes saved on every bloc show in dollars in the day's profits.

THE CAR OWNER demands Heald regrinding because of its efficiency and economy. A Heald-ground cylinder is as perfect as mechanical means can make it. 90% of all motor manufacturers finish their cylinders by grinding and use Heald machines exclusively. Naturally the owners will want the same grade of finish when regrinding in order to maintain the high standard of their power plant.

If you are considering this work, visit several regrinding shops, get in touch with the manufacturers themselves, and finally question various motor owners as to what equipment they advise to handle this work so as to bring you ultimate success. Let us send you convincing literature or even give you a personal call. No obligation. Glad to do it.

**The Heald
Machine Co.**



**61 New Bond St.
Worcester, Mass.**

He Charges less
but
Makes more
with
AUTO-HONE

A garage man in the West collected \$244.00 in one week for HONING CYLINDERS with Auto-Hone besides his profit on new pistons, rings and pins. He did SIXTEEN jobs in one week—charged less than the regular rate for resizing cylinders and made more money. He gave quicker service and did finer work.

YOU CAN DO THE SAME

Auto-Hones are made in two sizes:
For cylinder 2 13/16 to 3 3/8 bore\$85.00
For cylinder 3 1/2 to 4 1/2 bore 95.00

A complete illustrated direction sheet accompanies each tool which enables you to do perfect work right from the start.

Don't overlook this opportunity. Send your order in or write for information today.



Slip Auto-Hone into cylinder—connect its steel driving handle to your electric drill—turn on the power—and the work is started. The AUTO-HONE is designed to remove metal as well as burnish and polish the walls.

Pressure on the stones is regulated from the driving end of the tool. As the stones are forced out radially, the AUTO-HONE centers itself.

No expert help needed.

CYLINDER
THE AUTO-HONE CO.
GENERAL OFFICES **INDIANAPOLIS** 1587 MAIN STREET
BUFFALO, N.Y., U.S.A.

DE LUXE
Products
for the Motorists' Comfort



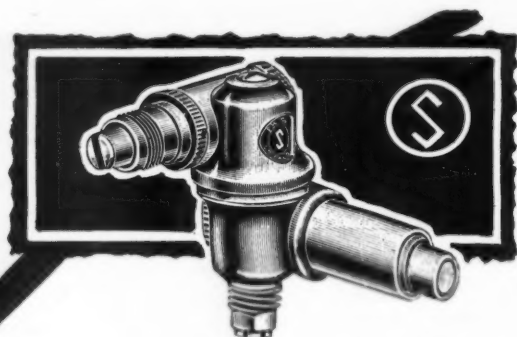
None but a very
un-ordinary pump
could carry such a
strong guarantee

**ORDER DIRECT
SPECIFYING
JOBBER**

The
DeLuxe
TIRE PUMP

Also
ARVIN HEATERS
DE LUXE.
DE LUXE VENTILATORS

INDIANAPOLIS PUMP & TUBE CO.
INDIANAPOLIS



Interchangeable Parts!
Circle "S" Swivel Joint
FOR SPEEDOMETERS

Another feature of the Circle "S" that makes it easy to sell is the interchangeability of its parts. It enables the car owner to get twice as much service out of a Circle "S" that he can get out of the ordinary swivel joint.

It will pay you to get behind the Circle "S." Its 8 exclusive features insure easy sales.

Manufacturers

F. W. STEWART MFG. CORP.
356 W. HURON STREET CHICAGO, ILL.

Manufacturers of the Well Known Circle "S" Windshield Cleaner.

Write Us Today for Full Details

CLASS JOURNAL PUBLICATIONS
AUTOMOTIVE INDUSTRIES

The Engineering and Industrial Authority of the Automotive Field—Motor Cars, Trucks, Tractors, Airplanes. Read by Engineers, Production Managers, and other Executives of Automotive Manufacturing Companies.

MOTOR AGE

A Dealers' Journal, devoted principally to Service and the Maintenance of Automotive Apparatus and Equipment. In conjunction with Motor World, covers nearly 90% of the principal Dealer field.

MOTOR WORLD

A Dealers' Journal, devoted principally to the Distribution or Merchandising of Automotive Products and Equipment. In conjunction with Motor Age, covers nearly 90% of the principal Dealer field.

MOTOR BOAT

The oldest motor boat publication in the world. Read by Boat Owners, boat builders and supply dealers.

MOTOR TRANSPORT

The Oldest Truck publication in the United States. Read by Fleet Owners, their Traffic and Garage Managers. The logical medium for an advertiser who wishes to reach the real, important truck users.

EL AUTOMOVIL AMERICANO

The only automotive export paper, going exclusively to Dealers and other members of the Automotive Trade in Latin America.

DISTRIBUTION & WAREHOUSING

Reaches 75% of the purchasing power wielded by the Transfer & Storage Industry, Transportation Companies, Pool Car Distributors, Public Merchandise Warehouses. A wealthy and active field needing Trucks, Labor Saving Devices, Warehouse Equipment, etc.

THE TIRE RATE BOOK

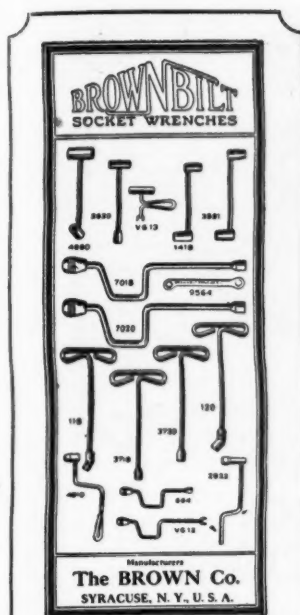
A quarterly publication containing special current information for Tire Dealers—price lists, types, sizes, etc. In constant use by practically all principal tire distributors.

THE CLASS JOURNAL COMPANY

CHICAGO
Philadelphia

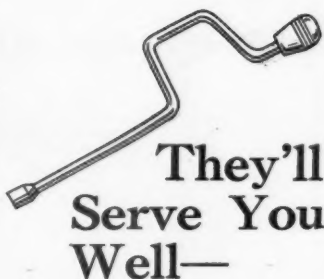
Cleveland

NEW YORK
Detroit



A Business Getter

Display this full assortment of Ford Car Wrenches. You'll find it a source of profitable business. Six of each type — altogether 96 wrenches. List price, \$99.00. Handsome display board free. Your jobber can supply you.



Whether for resale or for your own use—Brownbilt Wrenches will serve you well. Built of the finest materials and backed by fourteen years of manufacturing experience.

Send for catalog which describes full line. Sold by leading jobbers everywhere.

The Brown Company
Bellevue Ave.,
Syracuse, N. Y.

Representatives:

D. W. Van Keuren Co., 139 W. 42nd St., New York City.
Schoen Bros., Boston Bldg., Louisville, Ky.
M. B. Berkman, 406 Carleton Bldg., St. Louis, Mo.
Sanborn & Fulnam, 20 Steuart St., San Francisco, Cal.

Profitable To Handle

The Higgin All-Metal Visor makes money for you because it is adaptable to all makes of cars, including Fords—and because its price is popular.

\$3.50 within reach of all

Made of 22 gauge cold rolled steel—finished in hard enamel, black outside, green inside. Turned up gutter which acts as water drain. Staunch and sturdy—perfect fitting brackets. Cannot rattle, flop, tear or crack.

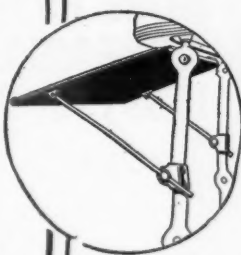
Get the Higgin Selling Plan. A real merchandising assistance. Further—your territories are protected. Write at once.

THE HIGGIN MFG. CO.
Automotive Division

Newport,

Ky.

HIGGIN ALL-METAL VISOR



Sells big at
\$3.50
and nets a
real profit.

Installed in
twenty minutes.
Easy and quick
to adjust. Will
not jar out of
position

Ever-Ready—Automatic Hose Clamps

The Last Word in Hose Clamp Perfection
ONCE USED—EVER USED

One Piece — quick adjustable — automatic — self tightening — low priced and fully guaranteed. Economical—durable—safe. Does not cut or buckle the hose. Easy to apply — easy to remove.



Patents Pending

Made in four sizes from 1/2" to 3 1/4" from galvanized steel or all brass—Nut and bolt included. It is a strictly high grade product at a low price. Made automatic or plain.

SIMPLEX ONE PIECE QUICK ADJUSTABLE

hose clamp made in two sizes from 1" to 3 1/4" galvanized steel. It is Simple—durable — low priced. (Not automatic)



DUPLEX AUTOMATIC HOSE CLAMPS

Once Used—Ever Used

One Piece — Quick Adjustable — Automatic — Self tightening. Made in four sizes from 1/2" to 3 1/4" in steel galvanized. They are fully guaranteed. Made in automatic or plain.



EVER HOLD SOLDERLESS

Spark Plug Terminals

A child can install it in a few seconds. Will fit any make of spark plug or cable and requires no soldering. It is everlasting. Can test, connect or disconnect spark plug wire while the engine runs. It is dependable, durable and guaranteed.



MADE BY
VITEK MFG. Co.
OMAHA, NEB.
U.S.A.

Notice to Manufacturers and Jobbers:

Get our free samples, prices and descriptive literature. All our products are fast sellers because they have merits, quality and low price, and are guaranteed by us.

VITEK MANUFACTURING CO.
Industrial Bldg. Omaha, Nebraska

Stafford's AUTO PRODUCTS



STAFFORD'S GASKET CEMENT AND GASKET SHELLAC

are compounds of the highest grade for ensuring tight joints wherever gaskets are used. They are not only leak-proof but water-proof and oil-proof. Many other uses; an all-around, handy product.

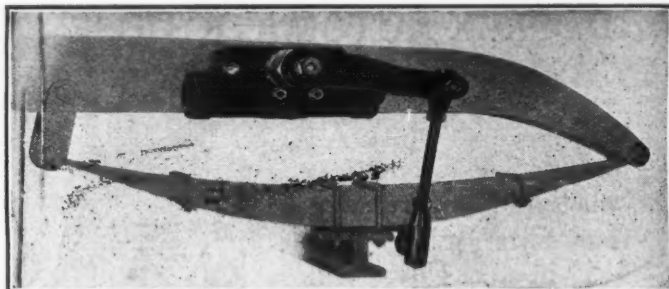
**Write for full particulars
about the Stafford Line**

Made by the manufacturers of Stafford's inks and backed by a reputation of 65 years' standing, the Stafford Line includes these fast-selling products:

Renol, the Creamy Polish
Penetrating Graphite Oil
Radiator Stop Leak
Black Liquid Tire Cover
Auto Cushion and Top
Dressing
Generator and Magneto Oil

Carbon Remover
Cleaning Fluid
Metal Polish
Neatsfoot Oil
Rapid Tar Remover
Rapid Repair and
Engine Enamel

S. S. Stafford, Inc., 603 Washington St., N. Y.



QWAY HYDRAULIC SHOCK ABSORBERS

(formerly called the Hydraulic Spring Control)

are the result of exhaustive scientific tests leading to the successful solution of the shock absorbing problem.

It oil-cushions all movements of the body to and from the chassis. This wonderful achievement is only possible by means of our exclusive dual valve system.

OWNERS ARE BOOSTERS

Let us tell you more about this wonderful customer-satisfying, money making device.

AUTO SPRING CONTROL COMPANY
Jamestown New York



ITS fine tempered steel gives it resilience and ease of operation —its reinforcement and locking device make it fool-proof in every way.

MALCO Windshield Cleaner

deserves the preference it is everywhere being accorded—for its fine looks, its sturdy build and its very moderate price.

Fits any make or style of car.

Single Type\$1.50
Double Type 2.00

Ask your jobbers' salesmen about the Malco products or write us direct, sending name of jobber.

Malco Products Corporation

220 W. S. Temple, Salt Lake City, Utah



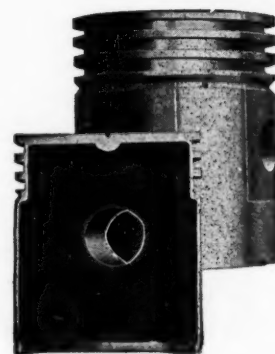
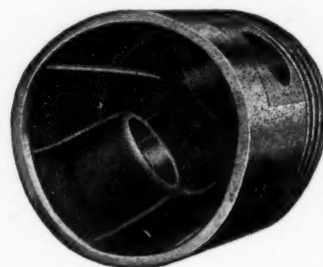
MORE POWER MORE MILES LESS CARBON

is what you buy
with

FOSTER

Sensible lightweight
PISTONS

MR. JOBBER AND RE-GRINDER — An immense amount of the motoring public is now fully appreciating the superiority of Foster sensible lightweight pistons and it has turned the tide of piston replacements Foster way. You can do no better than to stock with Fosters now.



Foster-Johnson Reamer Co.

1052 Beardsley Avenue,
Elkhart, Indiana

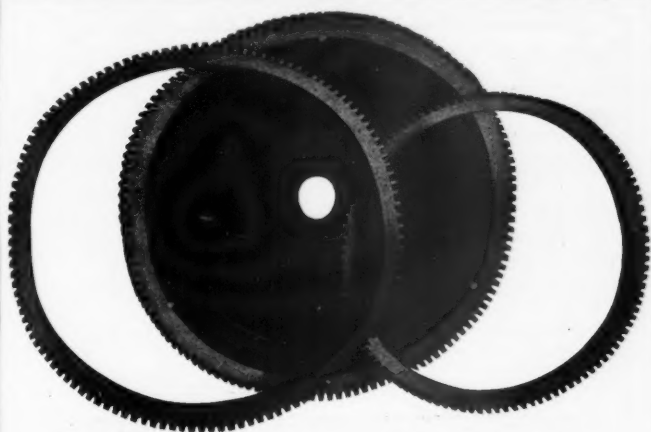


No More Ignition Trouble

The H & H Ignition System gives the Ford motor the two essentials to perfect combustion, a hot generous spark and a spark timed with absolute accuracy. This System prevents carbon formation because it eliminates tardy intermittent firing and enables the driver to make a quick get-a-way. The motor runs smoother and it can be throttled down to 1½ miles per hour without a buck.

Ask us for our selling proposition on the H & H Ignition System which shows you how to make profits every month in the year. The list price is \$22.50 for the complete unit. Manufactured by The H & H Generator-Ignition Co., 185 Middle Street, Bridgeport, Conn.

The H & H Generator—Ignition Unit for Fords



New Low Prices On Fly Wheel Rings

Increased quantity production has enabled us to get out a new and lower price list on Meachem Steel Gear Rings for Fly Wheels. Also our trade discounts have been increased to more than offset the lower list prices. Write us for the new list and discounts.

The Meachem Gear Corp'n.
Ring Dept. Syracuse, N. Y.



Bosch



The
Robert Bosch
Electric Horn

To Hear It Is To Want It!

Therefore, an easy, profitable seller, like all genuine, original Bosch Products.

The Robert Bosch Electric Horn

should be one of your sales leaders right now. Send for latest literature on Robert Bosch Magneto, Spark Plugs, Horns and Spot Lights.

Robert Bosch Magneto Co., Inc.

Otto Heins, President

123 West 64th Street New York

Chicago Branch: 1302 South Wabash Ave.

Several Hundred U. S. Service Stations—

Representatives the World Over

The Genuine, Original Bosch means Robert Bosch only.

Patents
Sept. 9, 1913 July 16, 1918
May 1, 1917 Oct. 10, 1920

COLE VISIBLE Gasoline Gauge

for Fords and Chevrolets

Here is a new, fast-selling accessory for Ford and Chevrolet cars. Once tried, drivers find they cannot get along without it. It tells them the four things they need to know most frequently:

- 1 How much gasoline is in the tank.
- 2 How much gasoline to order at the filling station.
- 3 How much gasoline they get when they buy it.
- 4 How many miles to a gallon of gasoline.

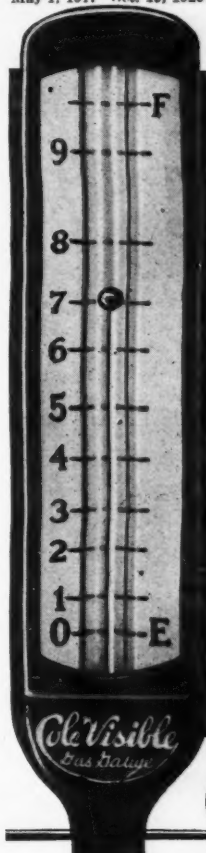
Attractive — accurate — always plainly visible upon the instrument board.

Write to us for our
dealer's proposition.

The Stemco Engineering Co.

70-78 Webb St.

Dayton, Ohio



Cole Visible
Gasoline Gauge

only
\$6.00

Send me your dealer's proposition
as advertised in Motor Age.

Name

Address

ELEGANT!

IS THE WORD THAT DESCRIBES THE

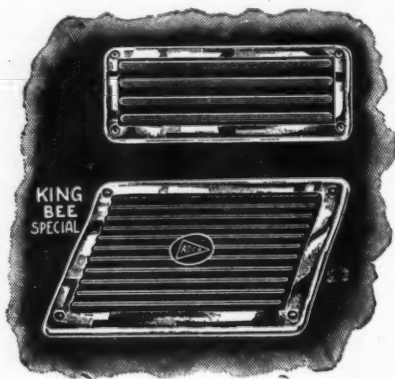
KING BEE SPECIAL

These plates will add to the appearance of any car because they are made of hard aluminum (not soft castings) and therefore will hold a beautiful mirror finish.

Both the plate and the kick possess rubber mat inserts of non-blooming live rubber extending above the frames and forming a drain preventing the accumulation of water and slush.

A handsome display easel with every dozen sets.

Dealers: Ask your jobber for prices, or write us if you have any difficulty.



RETAILS AT \$2.50 COMPLETE

This includes plate, kick with both rubber mat inserts and necessary screws for attaching.

Manufactured by

AMERICAN

AUTOMATIC DEVICES CO.

502 So. Throop St.

Chicago

The Ultimate Way WET INTERNAL GRINDING

Wet grinding, as made possible by the Micro Internal Grinder is as far in advance of ordinary dry grinding as the present day automobile is over the old ox team.

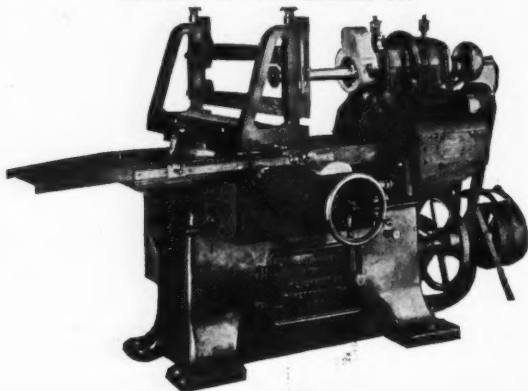
Micro

The Micro is a highly developed type of internal grinder adaptable for either wet or dry grinding, at the option of the operator, permitting highest quality of results. Its automatic action, both as to cut, feed and table travel provides the most accurate work humanly possible in exceptionally quick time.

If you're going to get a grinder, get the kind that will pay you biggest returns. Our bulletin gives full information—send for it.

MICRO MACHINE COMPANY, Bettendorf, Iowa

Successor to B. L. Schmidt Co.



Are You Supplied?

More car owners mean more Gauge buyers.

More consumer advertising means a wider demand.

Have you measured your season's requirements of TWITCHELL GAUGES on this basis.

Do not wait until your shelves are bare before sending in re-orders.

To do so may mean possible loss of sales.

Twitchell Gauge Company

1516 South Wabash Avenue
Chicago, Illinois

The TWITCHELL Saves Tires

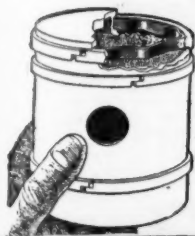
In Cleveland It's The HOLLENDEN

Because it has the dignity that comes from proper equipment and years of experience in service. Because it knows the requirements of fastidious patronage through having satisfied them. Because its rooms are clean and comfortable and its restaurants are nationally famous. Because its aims and its performances have always been to high standards. Because it is absolutely central to all of the important activities of Cleveland.

Information booklet free

THE HOLLENDEN HOTEL COMPANY, Cleveland





Retail Price, only 30c each
up to 3-8 in. wide or 5 in. diam. Larger,
50c. Order just like piston rings.

Dealers: Find your jobber in the list.
If not there, send us his name today.

Jobbers: Write today—find out why
scores of big jobbers count this one of
the six best sellers.

GENUINE APEX INNERINGS (INSIDE PISTON RINGS)

QUALITY of DISTRIBUTION behind Genuine APEX INNERINGS
and its sweeping extent prove the deep-rooted success of the article to

STOP OIL PUMPING—PISTON SLAP

Fully protected by the manufacturers rigid guarantee, the trade
knows and hundreds of thousands of car drivers, fleet owners, gas
engine owners and operators of every class know that there is only
one genuine and successful Innering on the market, fully patented in
the U. S. and Canada, that will bring back power, silence and econ-
omy of operation. Dealers, garage and repair men everywhere know
these things and know how Genuine Apex Innerings stop oil pump-
ing, piston slap and excessive carbon without costly reboring. See
your dealer today! He knows Genuine APEX INNERINGS!



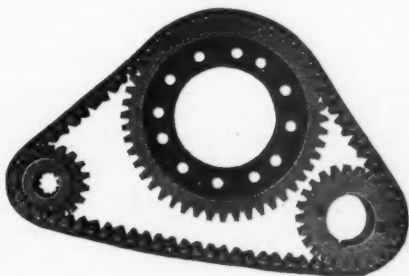
There is only one Genuine Inner-
ing—THE APEX—and it is fully
covered by U. S. Patents.

Thomson-Friedlob Mfg. Co., Peoria, Dept. C, Illinois

"WHITNEY"

LONG SERVICE CHAINS HIGH MILEAGE
SILENT TYPE

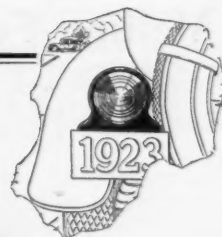
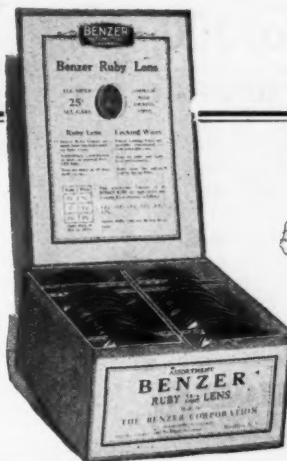
Never Skip the Sprocket Teeth



Unrivalled for Great Mileage

THE WHITNEY MFG. CO.
HARTFORD, CONN.

New York Boston Philadelphia
L. C. Biglow & Co., Inc. George C. Steil, R. J. Howison
232 West 55th Street 200 Devonshire Street 1361 Ridge Ave.
San Francisco, A. H. Coates Co., 770 Mission St.



The Only
COMPLETE
Assortment!

BENZER RUBY LENSES

Complete—because the assortment contains Ruby Lenses in every
size you are likely to need.

Complete—because for every lens there
is a spring steel locking wire that holds
the lens firm. Benzer Ruby Lenses are
made of finest Ruby Glass and throw a
real red danger signal.

Assortment packed in two-color cartons
which make attractive counter displays.
Shipping unit includes 10 assortments.

Assortment
Retails for **\$6.25**

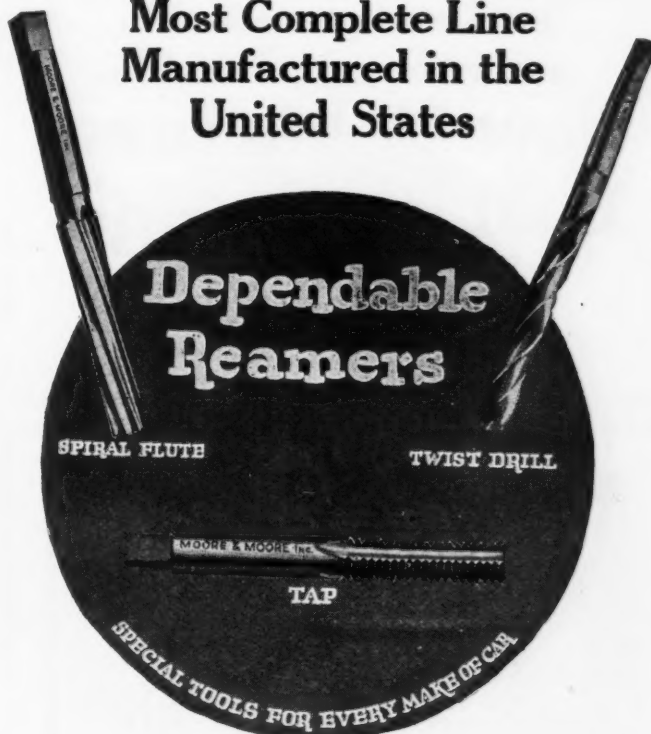
Ask your jobber today!
He has them

THE BENZER CORPORATION
Myrtle & Cooper Aves. Brooklyn, N. Y.

Assortment Includes	
25 BENZER	
RUBY LENSES	
and Locking Wires	
1-2 1/2 IN. SIZE	"
12-3	"
6-3 1/4	"
3-3 1/4	"
2-3 1/4	"
1-3 1/4	"

BENZER
AUTOMOTIVE
GLASSWARE

Most Complete Line
Manufactured in the
United States



Moore & Moore, Inc.
Reading, Pa.

A JOHNSON No. 300 Melting Furnace

Will melt 150 lbs. of soft metal quicker, cheaper and less trouble to operate than any type Furnace. Does not require a forced air blast.

Installed instantly by connecting to city gas pressure and consumes only 40 cu. ft. of gas per hour. Complete with Melting Pot—

\$25.00

Write for catalog of Gas Appliances.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA



No. 300

Sales Testify to Merit

New ERA Bumper factory again is being enlarged to meet heavy demand.



New Duo-Convex Bumper with back bar reinforcement. Double convex spring bars with graceful stream lines. Black or full nickel. \$17 to \$24, according to size and finish. Without back bar, for Fords and other light cars, \$14 to \$17.



The New Duplex Sport Model. Most beautiful bumper on the market. Black Japan or nickel. Medium cars, black, \$16.50, nickel \$18.50. Large cars, full nickel only, \$26.

This is fourth addition in four years—proof enough of public approval.

Write for catalog.

New Era Spring & Specialty Co.

SMALLEY DANIELS, President

70 Cottage Grove St.

Grand Rapids, Mich.

Export Dept. 130 West 42nd St., New York City

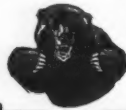
PARKER VISES

Have Swivels that Grip Like a Grizzly

Not a mere clamping device, but a wedge and ring construction that gives a gripping power 360 degrees of the base.

Send for Parker Feature Folder No. 39

The Charles Parker Co.,
Master Vise Makers
Meriden, Conn., U. S. A.



Rube says—Save money and metal. A longer lasting job—no danger of rust or corrosion when you use—

Rubyfluid
TRADE MARK REG.

For All Metals

COMBINATION
SOLDERING AND TINNING FLUX

A complete substitute for dangerous acids, commonly used as a Flux. Ruby Fluid is quick acting, anti-rusting and always ready for instant use. Ruby users include the foremost industries of the country. NON-EXPLOSIVE, NON-CORROSIVE, NON-INJURIOUS.

THE RUBY CHEMICAL CO.

68-70 McDowell St.

Columbus, O.

New Departure Ball Bearings



WHEN ALL advertisers demand their money's worth, all publications will provide circulation reports verified by the Audit Bureau of Circulations.

It is one of the mysteries of the advertising world that while all manufacturers demand verification of weight and quality in the material purchased, some of them still buy advertising space without knowing what they are paying for.

Such advertisers, however, are now exceptional. Most of them demand verified A. B. C. circulation statements before placing contracts.

In the case of MOTOR AGE, the demand is immediately met.

It is a member of the Audit Bureau of Circulations.

BLACK & DECKER

SPECIAL
HALF-INCH
DRILL

"With the Pistol Grip
and Trigger Switch"



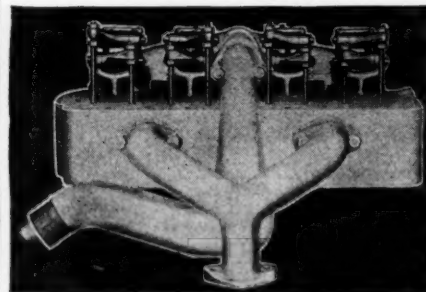
\$68.00

THE BLACK & DECKER MFG. CO.
TOWSON, MD.

ROOF 16 OVERHEAD VALVE EQUIPMENT

For Ford and Dodge Motors

ROOF 8 VALVE HEAD FOR FORD MOTOR



Stupendous Power—
Lightning Speed

Ford racing cars with Roof Equipment are rivals on mile and one half mile tracks of the highest priced racing cars. Doubles the pulling power of the Ford or Dodge pleasure car or truck. Hill climbing and general road work beyond wildest dreams of the owner. Complete—ready for installation—no machine work necessary. We are headquarters for all speed equipment. No matter what you want, write us. Racing quality—lowest prices. A postal card brings you complete list of our specialties.

Jobbers—Dealers—Consumers—Write Us

THE LAUREL MOTORS CORPORATION, ANDERSON, INDIANA

There's a GILLIAM Bearing for practically every application and every location in every make of automotive equipment.

Cups Cones Rollers
Alloy Steel Throughout



THE GILLIAM MFG. CO.

Canton, Ohio

Dealers and Distributors Wanted TO SELL

WOLLO SPARK PLUGS

Pack them full of oil or grease, they'll fire. Keep down carbon—save gasoline.

Write Us Today for Selling Proposition



WOLLO

3328 Olive St.
St. Louis, Mo.

MANLEY PORTABLE GREASE PAN AND TRUCK



This portable Grease Pan and Truck will be found to be most useful in every Garage, a considerable labor saver and a great promoter of cleanliness. It is run under the car when the crank case is removed and catches all the oil, grease, dirt, etc. It is large enough to receive the whole crank case for washing off the dirt and mud and cleaning it out. It is also used in the same way when taking down and washing off transmissions, rear axles, gears and other parts.

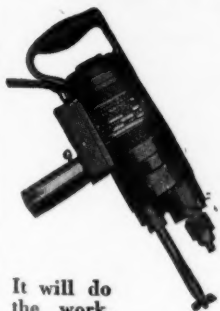
Bottom is lined with heavy oak boards, preventing puncturing the metal pan, which is removable. May be used as a handy truck around the Garage. Ball Bearing casters, flexible handle built to last; 24 in. wide by 36 in. long by 2 in. deep.

Send for Catalog

MANLEY MFG. CO.

YORK, PA.

The Garage Special



**Electric Drill and
Valve Grinder**

That saves every garage or repair shop time and money.

Louisville Electric Mfg. Co.

Incorporated

Louisville, Ky., U. S. A.

C. E. Willey, Pres. J. B. McFerran, Secy-Treas.

It will do
the work.

The MOHAWK SLIDING GEAR TRANSMISSION for FORD CARS and TRUCKS

DEALERS
Here is the
BIGGEST
PROFIT MAKER
IN 1923

Ford truck and passenger car users everywhere want MOHAWK Sliding Gear Transmissions. Produces more power and flexibility. Stops destructive vibration and motor racing. Attaches at rear of old transmission. Can be used with or without the old transmission. When used with you get SIX SPEEDS FORWARD and TWO REVERSE SPEEDS. When used without you get THREE SPEEDS FORWARD and ONE REVERSE.

Guaranteed for Life of Car or Truck

The Mohawk Transmission will outwear the car or truck in which it is installed. It is a complete unit in itself. Gives the Ford a speed for every road or hauling condition. Eliminates planetary troubles and necessity of replacing bands. In Ford truck the MOHAWK will pull three tons anywhere traction is possible. Built with nickel steel gears. Standard ball shift type gear lever and right hand emergency brake. The MOHAWK Transmission equipment can be installed in from five to six hours with an ordinary set of tools. No machine work necessary. Comes ready to install. Write for full description and prices.

Dealers: Write quick about open territory

MOHAWK MFG. CO.

Dept. M, Peoria, Illinois



There are BIGGER PROFITS in Repair Jobs WELL DONE

When a repaired car leaves your shop you know that it will give perfect satisfaction if the connecting rods and pistons have been aligned with the Eagle Universal Aligning Fixture.

There are no "ifs" and "ands";—no costly "make goods" when the Eagle Fixture is used on a job. Its mission is accuracy!

The Eagle Universal Fixture checks the alignment of wrist pins, bushings, connecting rods and pistons to within .001 of an inch. It detects the slightest bends or twists or any misalignment in the piston and rod assembly—thus assuring an accurate and dependable repair job.

For shops requiring an aligning fixture for all makes of cars the Eagle Universal Fixture with its four patented bushings is the most practical and efficient device on the market. These bushings permit alignment of any rods from 1 1/2 to 2 9/16 inches in diameter.

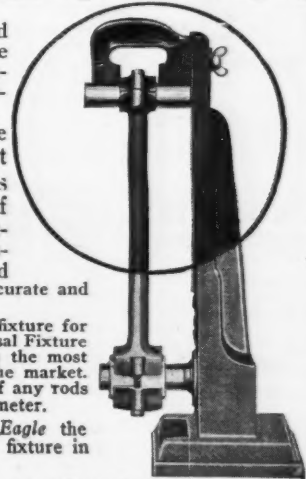
This feature alone makes the Eagle the most complete and only Universal fixture in the field.

Sold by leading jobbers everywhere—or, write us for full information.

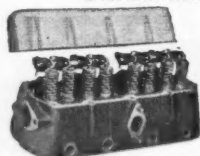
EAGLE MACHINE CO.

24 N. Noble St.,

INDIANAPOLIS, INDIANA



FRONTENAC CYLINDER HEADS and FRONTY-FORDS



The remarkable showing of the Fronty-Ford in the 500-Mile Race at Indianapolis May 30 was due solely to the performance of the Frontenac Cylinder Head. This Head is adapted for use on your Ford car by its designer and builder, Arthur Chevrolet. Write for FREE Catalog. Book, "How to Build a Fronty-Ford," \$2.00; free with orders of \$50.00 or more.

CHEVROLET BROS. MFG. CO., 410 W. 10th St., INDIANAPOLIS

Seven body types—\$1395—\$2385

STEPHENS

Finer Motor Cars  At Lower Prices



F-40 For Fords

and Chevrolets. A thrust bearing for the differential. Makes 'em push easier, climb better, dodge axle trouble.

Bantam Ball Bearing Co.,
Bantam, Conn.

KING QUALITY ALL THE NAME IMPLIES PISTON PINS

Automotive Division

KING SEWING MACHINE CO.

Buffalo, N. Y.

Bridgeburg, Ont., Can.



Pat.

"It Cleans
While
You Drive"

FOLBERTH Automatic WINDSHIELD CLEANER

A good profit for you in this wonderful, fast-selling necessity. Ask your jobber or write.

THE FOLBERTH AUTO SPECIALTY CO., CLEVELAND



Kant-Skore PISTONS

WEIGH LIGHTEST · FIT TIGHTEST

Regrinders, Repair Men, Dealers
Write for literature, price list and liberal proposition. Prompt service and delivery on all standard and special oversizes up to .065. Over 600 models.

THE KANT-SKORE PISTON CO., Cincinnati, Ohio, and Kansas City

Piston Pins and Valves

Oversizes

Standards

Specials

Prompt shipment, highest grade materials, precision accuracy to closest dimensions and unexcelled workmanship. Send for specification and price lists—they make pin and valve buying simple.

THE TRINDL CO., 2917 Wabash Avenue, Chicago, Ill.



STOPS GUESSING

Indicates definitely direction driver intends to turn. Signals at both front and rear of open or closed cars. Meets requirements of all State laws. Attractive — Durable — Effective.

Dealers — Jobbers, write for details and territory.
The Motor Products Co.
Norwalk, Ohio



Should Be On Every Car
You Sell

The Spencer Lock Tilting Steering Wheel first adds comfort in the driver's seat—then protects the car from theft. And the insurance it saves pays back the purchase price. Ask your jobber for details. Made for Ford, Dodge, Overland, Chevrolet 490 and Superior, Maxwell, Star and Gray Cars.

The Spencer Mfg. Co.
Spencer Ohio



KOKOMO RUBBER CO., Kokomo, Indiana
131 South Main St.

Kokomo Long Life tires and tubes make money for dealers who handle them.
Kokomo Twin-Grip Fabrics
Kokomo Two-Grip Cords
Kokomo Everlast Red Tubes
Kokomo Standard Gray Tubes



Just a Little Bit
Ahead

—with double pole automatic switch; maximum safety and efficiency assured.

JAS. CLARK, JR., ELECTRIC CO., Inc., LOUISVILLE, KY.

WARNER GEAR COMPANY MUNCIE, INDIANA



CLUTCHES, TRANSMISSIONS, CONTROLS, DIFFERENTIALS

Parallel Jaw K-D Valve Spring Lifters

For practically all L and T Head Motors. "Parkerized" against rust.

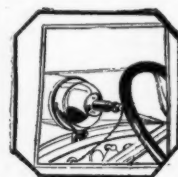
K-D MANUFACTURING COMPANY
LANCASTER, PENNA.



PRICE
\$2.50

"Universal" Type

"The Best-Equipped Shop
Gets the Business"



Sells Wherever Shown INSHIELD SPOTLIGHT

Fits snugly against windshield. No glass to cut. Easily and quickly attached. Can be pointed to any angle. Beautifully finished. Easy to sell. Jobbers, dealers, write for details.

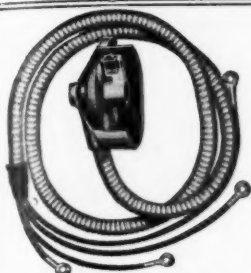
MADE ONLY BY
The Thal & Bitter Machine Co., Toledo, Ohio

ARE YOU LOOKING FOR A REAL BARGAIN?

Watch the classified advertising columns of MOTOR AGE and you'll see many of them. Often a man has goods for quick disposal and he announces the fact here. Whether or not you are in the market right now for certain things you will find it pays to look over the classified ads every time you receive your copy of the paper. It's a good habit to get into and some day you'll be mighty glad of it.

Get the Habit—

READ THE CLASSIFIED ADS IN MOTOR AGE



TURNER

2 in 1

TIMER

FOR FORD MOTORS

Pat. 2-15-16. 4-23-22.

The ever increasing demand for the Turner 2 in 1 Timer for all Ford motors is proof enough of its merit. Ford owners and dealers everywhere are coming to recognize it as the first product in the timer field. It has stood repeated and rigid tests for over six years. Increases power, insures an instant start in all weather, lessens fouling of two front plugs, saves gasoline and stops motor "kicking." Is oil, grease and waterproof. Requires no oiling and is easily installed. Price complete, \$3.60. Ask us about the Turner Junior Timer and the complete Turner Line of automotive devices.

TURNER MANUFACTURING CO.

DEPT. K.
KOKOMO, IND.

THERE ARE PARTICULAR WALDEN-WORCESTER SOCKET WRENCHES FOR PARTICULAR PARTS OF EACH PARTICULAR CAR



For over sixty makes of cars and trucks in general use today, Walden-Worcester has Service Selections of Socket Wrenches—each selection especially adapted for particular parts of the particular car for which it is designed.

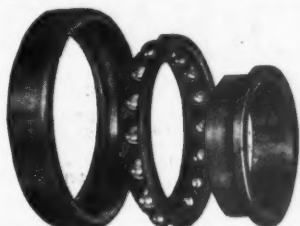
Your Jobber can supply you with any or all Selections from his stock. Write him.

WALDEN-WORCESTER

Incorporated

General Offices and Factory

Worcester, Mass.



Services of our Engineering Department are at your command at all times on layouts where Angular Contact Radial Bearings or Angular Contact Thrust Bearings are used. Our experience is broad and covers many years. When may we be of service to your organization?

The Bearings Company of America
Lancaster, Penna.

Western Sales Office,
1012 Ford Bldg.,
Detroit, Mich.



PARANITE CABLE

Best for Automotive Work

We carry at all times a complete stock of every kind of cable used for automotive work. Many years of specialization have brought **PARANITE** Cables to the highest state of perfection. The finest grades of rubber compound, cotton and flexible enamel varnish are used.



FOR 33 YEARS THE STANDARD
IF IT'S PARANITE IT'S RIGHT
Quality jobbers handle quality cable—that's **PARANITE**.

Indiana Rubber & Insulated Wire Co.

810 Marquette Bldg., Chicago
Factory and General Offices—Jonesboro, Ind.

FORD OWNERS—

NOW YOU CAN HAVE

THREE-SPEED Transmission

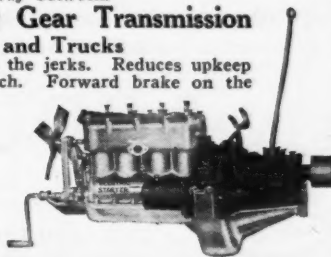
A three-speed forward, one reverse and replace the regular Ford Transmission, drums, bands and all—the low speed lower than the Ford low, therefore more power, the third or high is the same as the Ford high, and second is half way between.

Cronk Simplex Sliding Gear Transmission

For Ford Cars and Trucks

Saves rear axles by eliminating the jerks. Reduces upkeep on engine. Multiple disc clutch. Forward brake on the jack shaft outside of case. Ruggedly built with oversize alloy steel gears, Hyatt Roller and Genelite Graphite-Bronze bearings. Installation easy. No cutting or machining. Write today for other interesting details.

E. D. & A. F. Cronk, Inc.,
140 Hotel St., UTICA, N. Y.



Resize All Cylinders With This One Storm Tool

Even big 8 in. tractor cylinders. Handle them *ALL without the bother and lost time of changing heads, parts, blades or hones.*

Price Complete **\$36.25** Capacity $2\frac{3}{4}$ -8 in.

The ideal tool to resize cylinders without other machining operations, or to polish after boring, grinding or reaming for that Storm "gun-barrel" finish that is so popular.

Ask your jobber or write for Storm book.

STORM MFG CO

406A Sixth Ave., So.

Minneapolis



E-C-L Pistons

ALUMINUM ALLOY NON EXPANDING



How to Eliminate Piston Slap

Piston Slap is a common and vexatious cause of engine trouble which in the past has bothered most car owners.

But it can now be eliminated.

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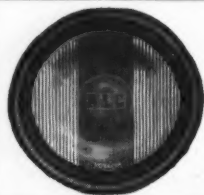


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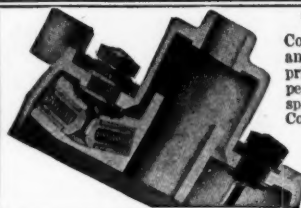
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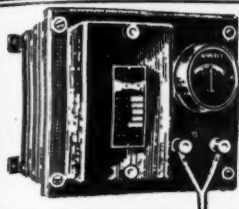
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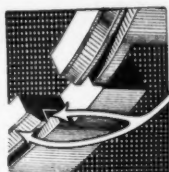
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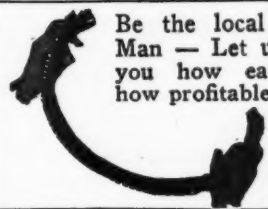


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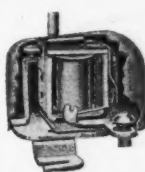
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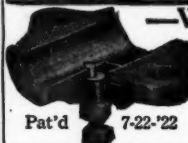


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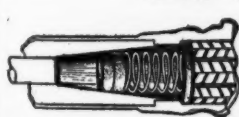
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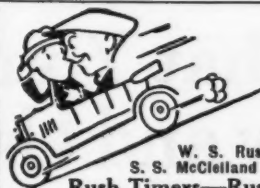


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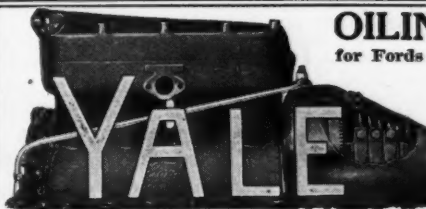
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ESTABLISHED 1894

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EXPERT CYLINDER AND CRANKSHAFT RE-GRINDING

SPECIAL LIGHT WEIGHT
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SCORED CYLINDERS REPAIRED

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NEW AND USED
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QUICK SERVICE

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RIGHT PRICES

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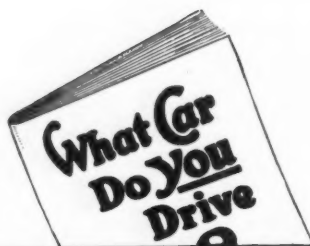
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INTERCHANGEABLE
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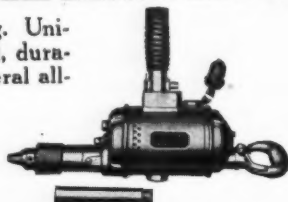
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Light weight. Ball-bearing. Universal motor. A powerful, durable, compact drill for general all-around use.

\$65



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A complete line of portable electric drills from ¼ in. to 1¼ in. capacity.

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1515 Freeman Ave., Cincinnati, Ohio

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Child or Stepchild? An Analogy

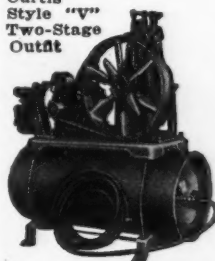
Maximum pressure—tank storage capacity—motor characteristics—automatic starting duty—frequency of operation—these are but a few of the problems peculiar to air compressors for free air service in garages and filling stations. It is to the purchaser's own greatest interest and protection to see that his CURTIS compressor outfit is a genuine CURTIS factory built product, factory guaranteed, supplied and sponsored by a designing, engineering and manufacturing institution with a career of 69 successful years.

When you purchase a CURTIS garage compressor outfit, built complete by the CURTIS organization in the CURTIS plant, your protection lies in the following facts:—

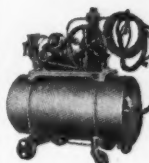
- 1—The proper relation and suitability of component parts. No misfit motors, switches and the like. Speeds, loads and capacities are right, starting loads are eliminated and there is a consequent freedom from trouble and expense which the chances favor in an amateur assembled outfit—a "stepchild" at best.
- 2—A complete unit tested as a unit under its own power in addition to the usual separate test of component parts; a final check-up under your actual running conditions duplicated in our shop.
- 3—The CURTIS guarantee covers the entire unit as a whole and the CURTIS organization stands back of it as a unit; no divided responsibility, no shifting of the blame for possible trouble later on,—“no passing of the buck.”

A Two-Stage Compressor Is Only as Good as its Intercooler

Curtis
Style "V"
Two-Stage
Outfit



- (a) COPPER Intercoolers with thin radiating fins rigidly attached are original with CURTIS two-stage compressors. One hundred and thirty-five per cent better heat-conducting properties than cast iron, 112% better than steel and 27% better than aluminum.
 - (b) CURTIS Intercoolers are approximately 50% longer and have about 100% more heat-radiating fins than competing designs.
 - (c) CURTIS Intercoolers are exposed their entire length to the cool blast of the fan flywheel.
- All the features of the CURTIS Single-Stage, plus real two-stage efficiency



Style "X"
Single-Stage
Outfit
Portable,
Belted or
Geared. Five
sizes, A.C.
or D.C. Motor.



Style "S"
Single-Stage
Outfit Belted
only. Five
sizes, 1/2 to 3
H.P.

We manufacture a complete line of both single and two-stage air compressors. A style, size and arrangement to meet your particular need. Write at once for full details and prices.

CURTIS PNEUMATIC MACHINERY CO.

1527 Kienlen Avenue St. Louis, Mo., U. S. A.
Branch Office 530-H Hudson Terminal, New York City.
Canadian Representative: Joseph St. Mars, Winnipeg and Toronto, Canada

Curtis Pneumatic Machinery Co.

1527 Kienlen Ave., St. Louis, Mo.

Gentlemen:—Please send me descriptive folder and full particulars on Curtis Air Compressors.

Name

Address

Jobber's Name

Address



Getting good gears quickly is a matter of great importance to every service station and repair shop. Good gears are hard enough to get, and it is still harder to get the combination of good gears plus good service, as represented in Double Diamond Service. However, Double Diamond "Nationalized Gear Service" solves the problem for you. Eight sales branches (see addresses below) and many jobbers located in every section of the country maintain complete stocks of transmission and differential gears for practically all cars. Orders are shipped the same day received.

Take advantage of this unusual service. You are not asked to take chances on the quality of the gears—a guarantee goes with every one.

We also supply fly wheel starter ring gears, rear axle shafts and silent timing gears for practically all cars. See your jobber or address our nearest sales branch. Price lists on request.

Automotive Gear Works, Inc.

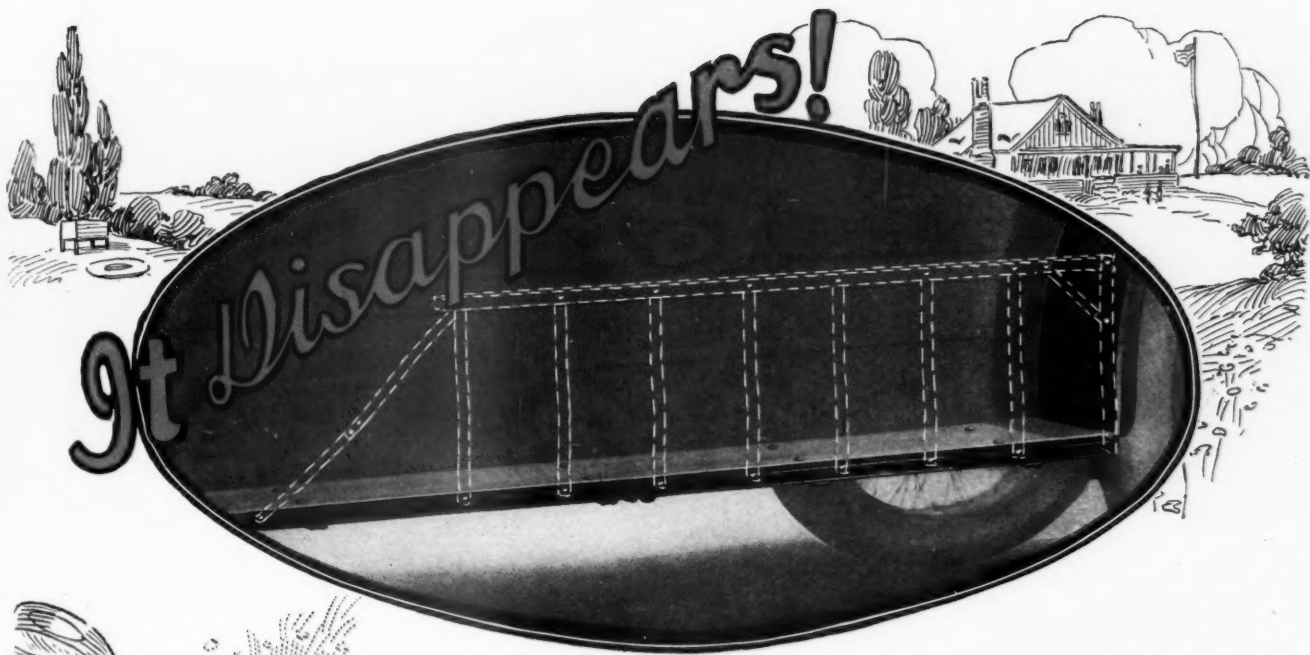
Factory and General Offices,
RICHMOND, INDIANA



Address Automotive Gear Co. as follows:

CHICAGO, 1425 S. Michigan Ave.; PHILADELPHIA, 1404 W. Girard Ave.; BOSTON, 1024 Commonwealth Ave.; LOS ANGELES, 1213 S. Hope St.; CLEVELAND, 6305 Euclid Ave.; SEATTLE, 520 E. Pike St.; ATLANTA, 174 Spring St.; RICHMOND, INDIANA, Factory.

Double Diamond **Gears**



"Rush those GRIP RACKS"

Dealers Wire Re-orders

RUSH re-orders tell the story of the big business that dealers are doing on the Milwaukee GRIP RACK—the new-idea luggage holder that folds (self-enclosed) at the edge of the running board. Many dealers have re-ordered three or four times!

"It Disappears!"—that's the big selling point. Snaps open instantly into a firm, roomy, good looking carry-all. Yet it folds—neat, inconspicuous and out of the way—when not in use. Never loose or lost—it is bolted solidly to running-board.

GRIP RACK appeals to the man proud of his car. It is smart, distinctive—he enjoys showing it to his friends. That means more and more sales for you.

A year-'round seller. Moves fast in summer to sporting and touring trade—in demand all the time for business, shopping and suburban use.

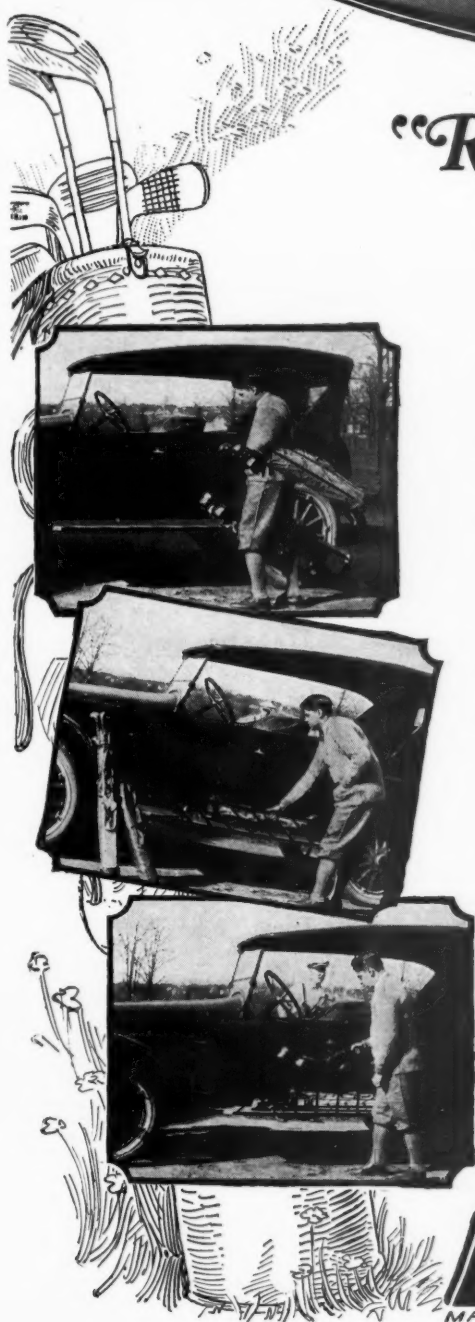
GRIP RACK cannot loosen, rattle, break or rust. Slots provided so luggage may be strapped in place, away from body of car. Finely-made — well-advertised — well-packed (individual cartons).

Made in 3 sizes and retails, according to length, at \$5.00, \$6.00, \$7.00. Pays a real profit.

Order from your jobber. Write us for descriptive literature.

MILWAUKEE MOTOR PRODUCTS, Inc., Milwaukee, Wis.
(Manufacturers of Fine Automotive Products for over 18 Years)

M I L W A U K E E
GRIP RACK
MADE BY THE MANUFACTURERS OF THE MILWAUKEE TIMER





Disteel Tuarc Forsyth

25 YEARS ago the first sale of an American motor car was made. *It ran!*—probably the principal selling argument.

Now that all cars *run*, sales emphasis has shifted to other factors; among the principal points, to wheels, the first moving parts seen!

The important first glance is apt to be highly favorable to cars with Tuarc, Disteel or Forsyth steel wheels.

Beauteous, but *practical* too. Strength with lightness; easy inflation, correct engineering—such tangible advantages as have made Motor Wheel the world's largest steel wheel producer.

Steel-wheel-equipped cars are better and sell better with Tuarc, Disteel or Forsyth steel wheels.

MOTORWHEEL CORPORATION, *Wood Wheels Steel Wheels, Stampings*, LANSING, MICH.

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Motor Wheel
PRODUCTS

